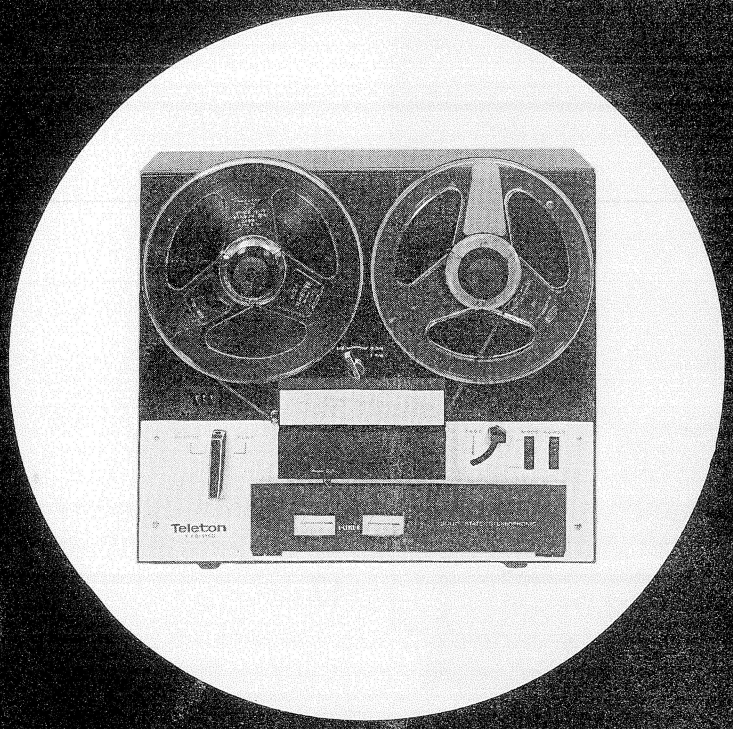

Teleton

SOLID STATE STEREO TAPE DECK MODEL FXB-510D

SERVICE MANUAL

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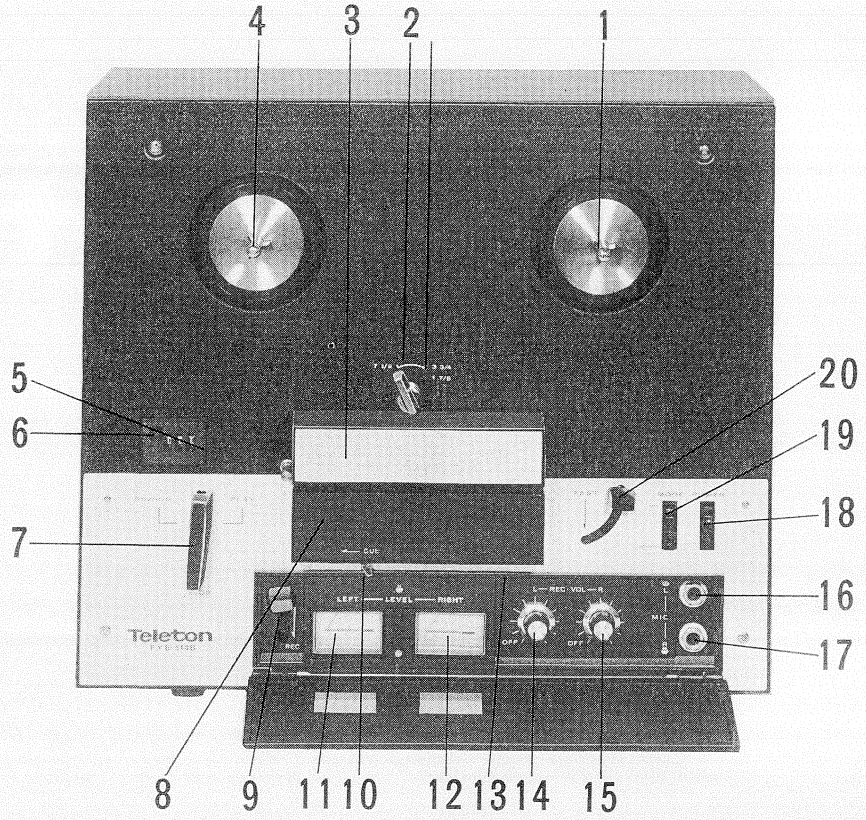
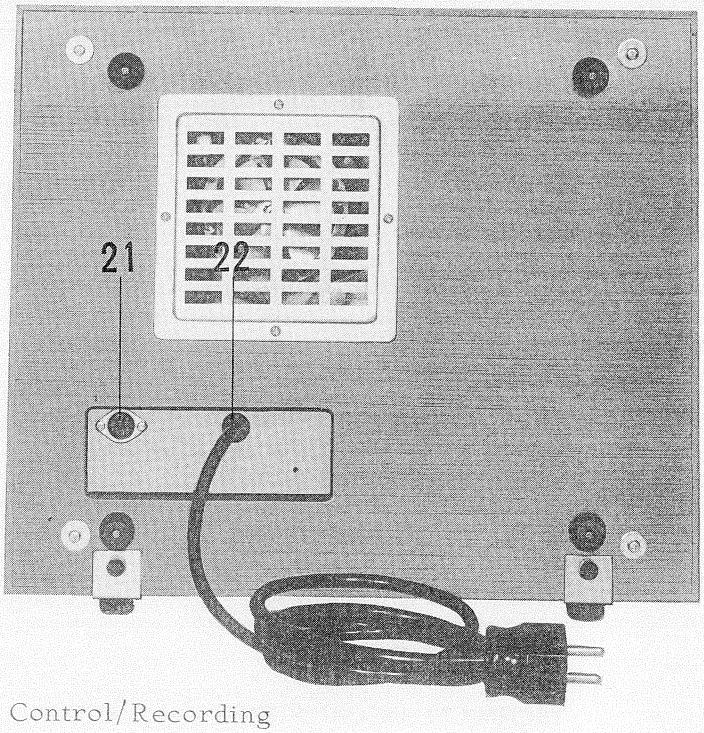
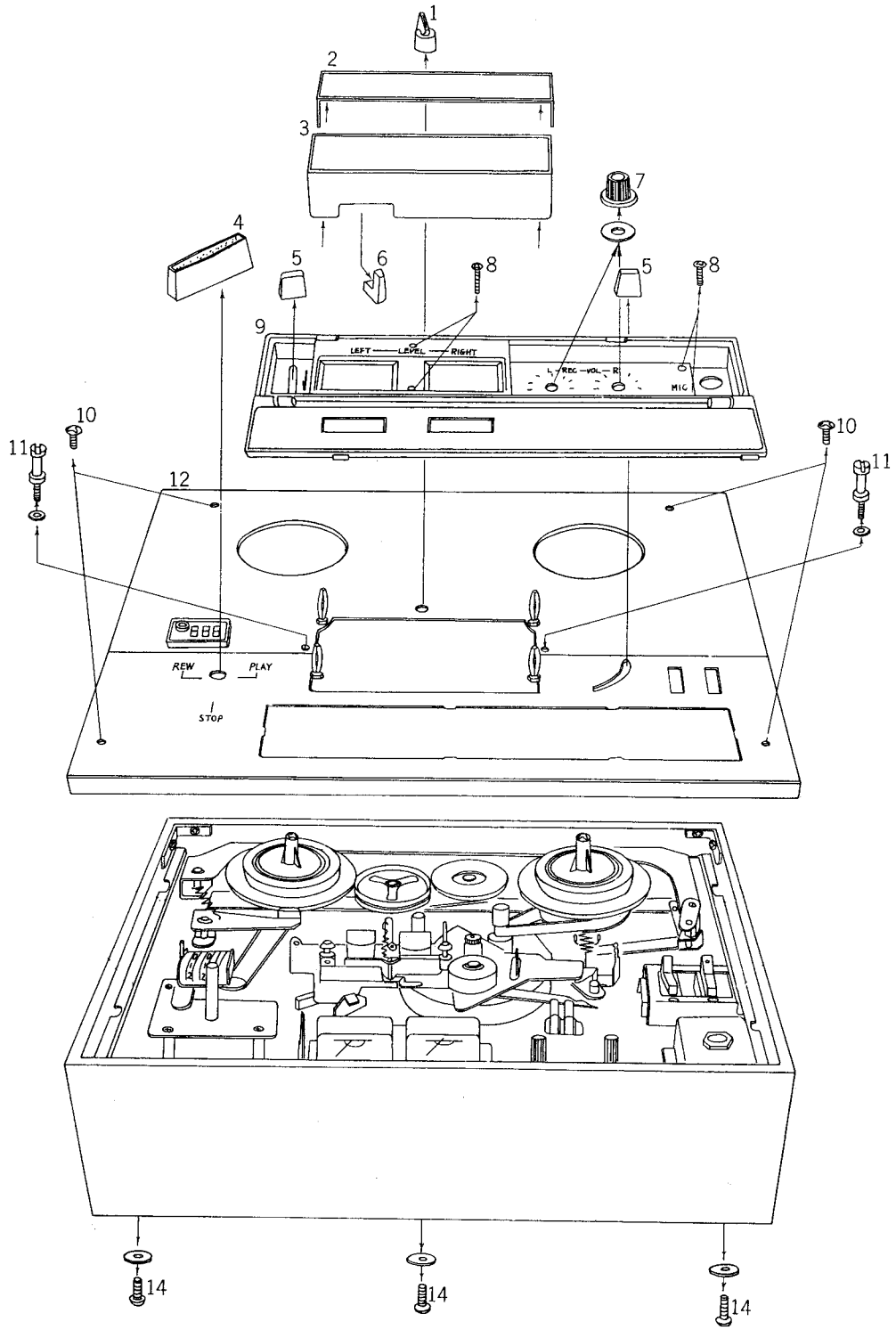




1. Takeup Reel Hub
2. Speed Selector
3. Head Cover-B
4. Rewind Reel Hub
5. Tape Counter
6. Tape Counter Reset Button
7. Function Control Lever
8. Head Cover-A
9. REC (Record Safety) Lever
10. Cue (Instant Stop) Lever
11. Left (Channel 1) Level Meter
12. Right (Channel 2) Level Meter
13. Automatic Shut-off Switch
14. Left (Channel 1) Recording Volume Control/Recording Cut-off Switch
15. Right (Channel 2) Recording Volume Control/Recording Cut-off Switch
16. Left (Channel 1) Microphone Input Jack
17. Right (Channel 2) Microphone Input Jack
18. Power ON/OFF Switch
19. Mode Selector (Mix/Stereo)
20. Fast Forward Lever
21. REC/PB Connector Socket
22. Power Cord

DISASSEMBLY INSTRUCTIONS:

1. After loosening the set screw, take off SPEED SELECTOR KNOB (1).
2. Pull out HEAD COVERS (2 & 3).
3. After loosening the set screw, take off SELECTOR KNOB (4). Pull out SLIDE KNOB (5) and VOLUME CONTROL KNOBS (7). Unscrew and remove CUE LEVER HANDLE (6).
4. Unscrew and remove four screws (8) and remove CONTROL PANEL (9).
5. Unscrew and remove four screws (14) at bottom of cabinet and carefully lift the mechanism out from cabinet.



TAPE TRANSPORT CONTROL FUNCTIONS

1. When the Channel-2 (Right) Volume Control is turned clockwise until it clicks, AC power is supplied to the recorder. Motor drives takeup friction pulley, but reel hubs will not rotate until the Selector Control Knob is turned to "PLAY" position.
2. When the Function Selector Knob is turned to "PLAY" position from "STOP" position:

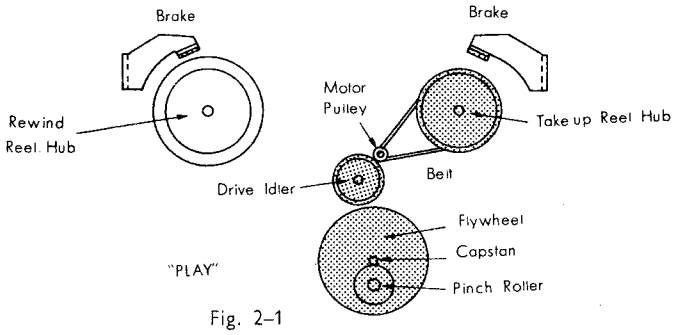


Fig. 2-1

   A. It moves both takeup and rewind brakes away from the respective reel hubs.
   B. Flywheel is driven by the motor pulley by means of the drive idler, thus rotates the capstan. The main drive belt will also rotate the takeup hub by friction.
   C. It forces the pinch roller to contact the capstan.
   D. It forces the pressure pads against both heads respectively.

3. When the Fast Forward Lever is pulled downward while the Function Selector Knob is set at "PLAY" position:

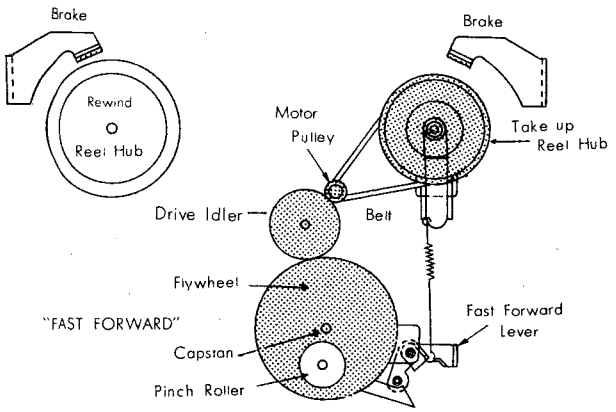


Fig. 2-2

   A. It moves the pinch roller away from the capstan and the pressure pads away from both heads respectively.
   B. It moves the takeup friction pulley upward thus makes tight contact between friction pulley and takeup reel hub and rotates the hub at fast rate.

4. When the Function Selector Knob is turned to "REWIND" position from "STOP" position:

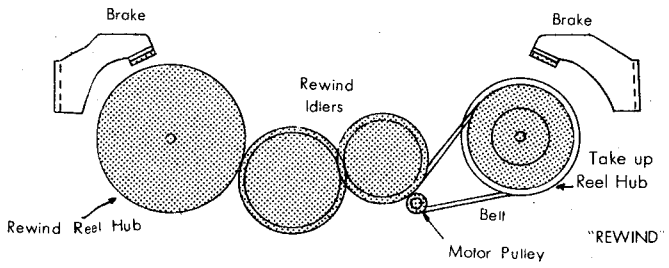


Fig. 2-3

   A. It moves both takeup and rewind brakes away from the respective reel hubs.
   B. Two rewind idlers are driven by the motor pulley thus rotates the rewind reel hub.
   C. It moves the pinch roller away from the capstan and the pressure pads away from both heads respectively.

5. When the Function Selector Knob is turned to "STOP" or "PLAY" positions:

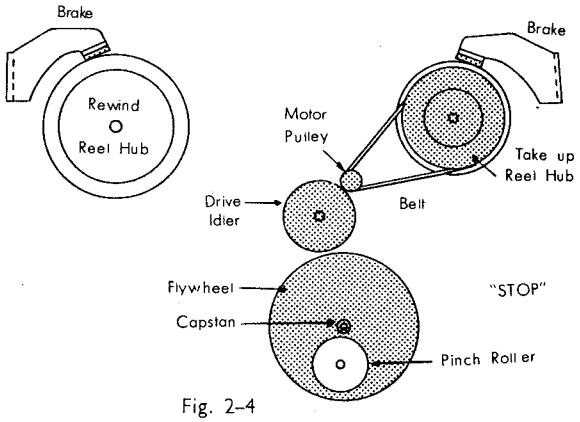


Fig. 2-4

   A. It moves the pinch roller away from the capstan and the pressure pads away from both heads respectively.
   B. Both takeup and rewind brakes will contact the respective reel hubs thus stops the rotation of reel hubs.

6. Tape Speed Selection:

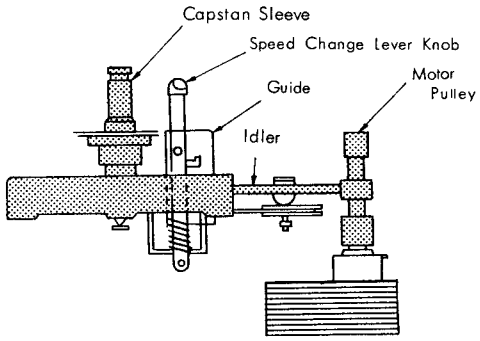


Fig. 2-5

   A. When the Speed Selector Knob is turned counterclockwise until it stops and released, it moves the drive idler upward. With this setting, when the Function Selector Knob is turned to "PLAY", flyweel is driven by the larger diameter step of the motor pulley by means of the drive idler, thus gives the constant tape speed of 7-1/2 ips by rotation of the capstan.

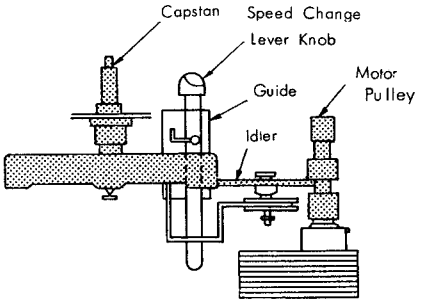


Fig. 2-6

B. When the Speed Selector Knob is turned clockwise with slight downward pressure until it stops and released, it moves the drive idler downward. With this setting, when the Function Selector Knob is turned to "PLAY", flywheel is driven by the smaller diameter step of the motor pulley by means of the drive idler, thus gives the constant tape speed of 3-3/4 ips by rotation of the capstan.

C. With the same setting per (B) above when the capstan sleeve is removed from the capstan, it gives the constant tape speed of 1-7/8 ips.

MECHANISM ADJUSTMENTS

1. Pressure Pad Retainer Adjustment:

Set the Function Control at "STOP" and adjust the screw of the Pinch Roller Lever so that the felts will be 7mm apart from respective heads

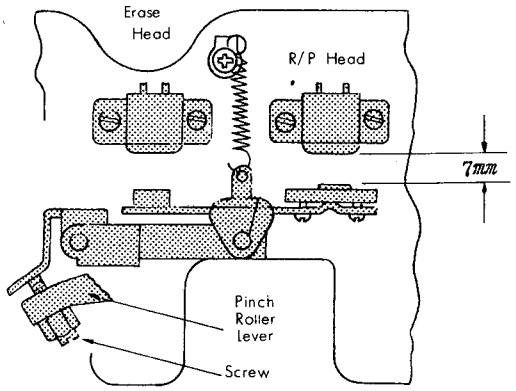


Fig. 3-1

2. Pinch Roller Pressure Adjustment:

Set the recorder at "PLAY" with the speed of 7-1/2 ips and hang a spring scale to the pinch roller shaft and pull, until the Pinch Roller is disengaged from Capstan and read the scale. The proper pressure is 1.2 Kg., so adjust the Pinch Roller spring tension accordingly by means of the adjustment screw.

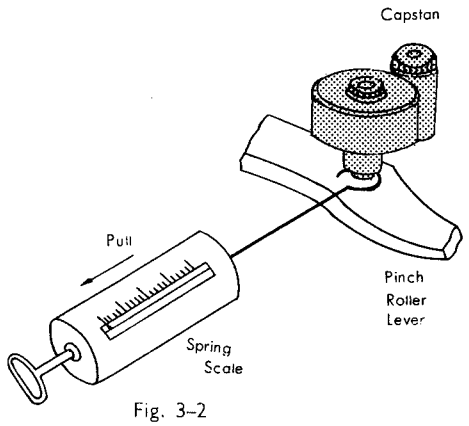


Fig. 3-2

3. Drive Idler Pressure Adjustment:

Set the recorder at "PLAY" and hang a spring scale to the shaft of the Drive Idler and pull, until the idler is disengaged from flywheel and motor pulley. The proper pressure is 450± 50gr. at 7-1/2 ips, so adjust the spring tension accordingly.

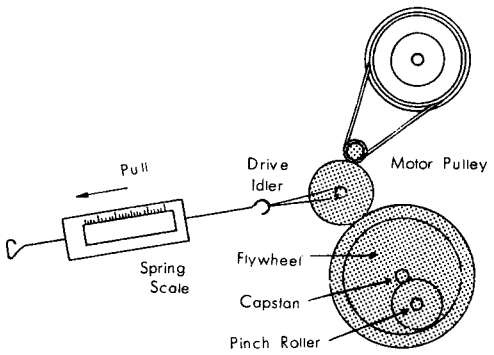


Fig. 3-3

4. Tape Pad Pressure Adjustment:

Set the recorder at "PLAY" and hang a spring scale to the Pressure Pad Retainer and pull, until the pads are disengaged from respective heads, and read the scale. The proper pressure is 50 to 60gr., so adjust the spring tension accordingly by means of the Metal Hook for Pad Spring.

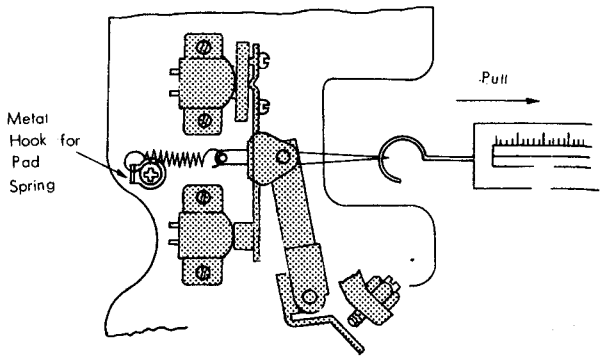


Fig. 3-4

5. Fast Forward or Rewind Torque Adjustment:

A. Place a 5 inch reel on the takeup or rewind reel hub and hang the end of the few feet of string wound on the reel on a spring scale as shown in the drawing and set the recorder either in the FAST FORWARD or REWIND modes.

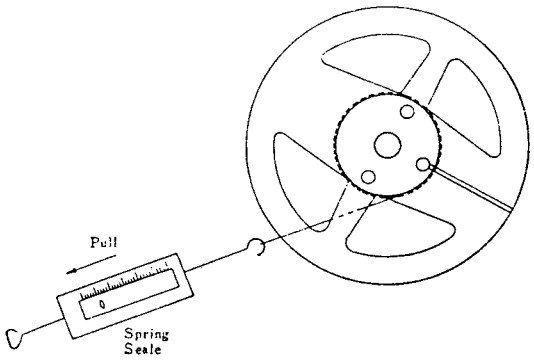


Fig. 3–5

B. Tension should be more than **800gr.** in the FAST FORWARD mode and more than **1.2Kg.** in the REWIND mode.

C. If the tensions are improper, adjust as follows:
   a. Clean oil and dust from all drive points to eliminate slippage.
   b. If torques are still improper, replace F.F. Spring or Rewind Spring.

6. RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT
Thread Ampex Standard Alignment Tape on the recorder. While playing back the head azimuth adjustment part, adjust the head mounting screw for the proper position which will give maximum output. The mounting screws must be fixed thereafter.

LUBRICATION AND CLEANING

All rotating parts are factory lubricated. However, lubricate sparingly with good quality 3-in-one or similar type of oil or good quality grease at lubricating points after every 200 hours of use. Excessive oil or grease is undesirable, and if the oil is overflown to the other parts, slippage might happen.

OILING POINTS:

2 drops to the pinch roller bearing
8 drops to the pinch roller felt
2 drops to the flywheel bearing
8 drops to the flywheel felt
2 drops to the rewind idler shaft
1 drop to the brake arm shaft bearing
1 drop each to the respective cam roller shafts
3 drops to the drive idler bearing

GREASING POINTS

Coupling points of the: Selector Cam and Cam Roller
Selector Cam and Selector Lever
Selector Slide and Cam Roller
Flywheel Shaft and Flywheel Shaft Bearing
Selector Slide and Selector Lever
Pinch Roller and Pinch Roller Lever Shaft

Sliding points of the: Rewind Slide and Rewind Idler Lever
Interlock Arm and Baseplate
Stop Lever and Baseplate
Slide Guide Plate-M and Baseplate
Idler Lever Plate and Idler Lever
Speed Selector Guide and Speed Selector Shaft
Idler Lever Supporter and Rewind Idler Lever

Two holes on the Selector Slide
Reel Hub Shaft (where the reel hubs and reel hub pulleys are coupling)

CLEANING

The record/playback head, erase head, tape guides, capstan and pinch roller are subject to an accumulation of tape coating residue. Use a cotton swab dampened with trichloroethylene to clean the above mentioned parts. Pinch Roller and Rubber Belt must be free from oil or grease.

Use a cotton swab dampened with trichloroethylene to clean oil from Pinch Roller, however DO NOT USE ANY CLEANING FLUID OTHER THAN "BENZINE" TO CLEAN OIL FROM "RUBBER BELT", otherwise damage to belt will occur.

When you clean these parts do not forget to also clean other rollers which are in contact with these parts.

ALWAYS CLEAN THE UNIT AFTER SERVICE IS COMPLETED.

AMPLIFIER ADJUSTMENTS

IMPORTANT: 1) Set the source voltage to 220V. AC.50 cps.
2) VTVM having scale of "millivolt" order is recommended.
3) Unless otherwise required, set speed for 7-1/2 ips.

I. PLAYBACK PERFORMANCE CHECKS AND ADJUSTMENTS:

A. Playback Frequency Response Test:
Instruments required: VTVM, Ampex Standard Alignment tape and 100KΩ resistor.
Measuring Ciruit: Refer to Fig. 4-1.

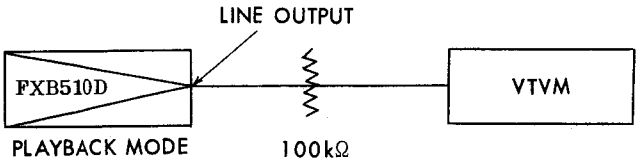


Fig. 4-1

1. Connect input of VTVM to Line Output Jack through 100KΩ resistor.
2. Put on Alignment tape and play 700 cps reference tone (-10db).
3. Using the level of 700 cps tone on VTVM as a reference, play tape from 12Kc to 50 cps and note deviation from reference on VTVM. Tolerance=±5db.

B. Playback Frequency Response Adjustments:
Playback frequency response settings are facotry adjusted and normally require no further attention, however, should adjustments be required, proceed as follows; after conducting Head Azimuth Adjustments.
1. If the high-end response is turning down, dcerease the capacitance values of C73 and C74.
2. If the low-end response is turning down, decrease the capacitance values of C15 and C16.

C. Playback Level Balance Check:
Instruments required: VTVM, Standard Alignment Tape, 100KΩ resistor.
Measuring Circuit: Refer to Fig. 4-2.

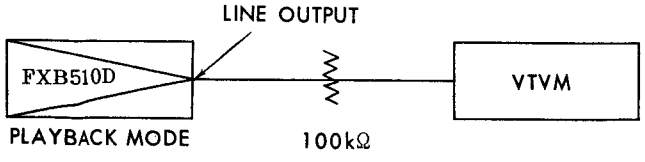


Fig. 4-2

1. Connect input of VTVM to Line Output Jack through 100KΩ resistor.
2. Put on Standard Alignment Tape and play 700 cps reference tone (-10db).
3. Reading on the VTVM should be more than 0db (0.775V) and difference between channels should be within 3db.

D. Playback Level Balance Adjustment:
1. Repeat steps 1-C-1, -2 and -3.
2. Adjust VR4 (or VR3).

II. RECORD LEVEL CALIBRATION:
Instruments required: AF Generator, VTVM, 500Ω resistor, 100Ω potentiomenter.
Measuring Circuit: Refer to Fig. 4-3.

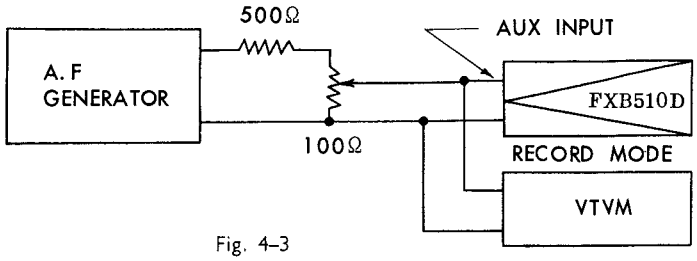


Fig. 4-3

1. Connect AF Generator output to AUX Input of recorder through 500Ω resistor and 100Ω potentiometer.
2. Set recorder to record mode and Volume Controls at "maximum" positions.
3. Set AF Generator output for IKc, adjust potentiometer to obtain 0-VU reading on recorder VU meter.
4. Measure input level of AUX INPUT by means of VTVM. The input level should be more than -21db (0.07 V).
5. If the input level is less than -21db, adjust VR5 and VR6.
6. While feeding IKc tone to the recorder, adjust potentiometer for Odb reading on VTVM then adjust recorder volume control to obtain 0-VU readings on recorder VU meter, and see that the difference in knob settings between channels is within digit. Also confirm that difference between channels is less than 3db.

III. RECORDING BIAS CURRENT AND FREQUENCY ADJUSTMENTS:

A. Bias Frequency Adjustment:
Instruments required: Oscilloscope, AF Generator.
Measuring Circuit: Refer to Fig. 4-4.

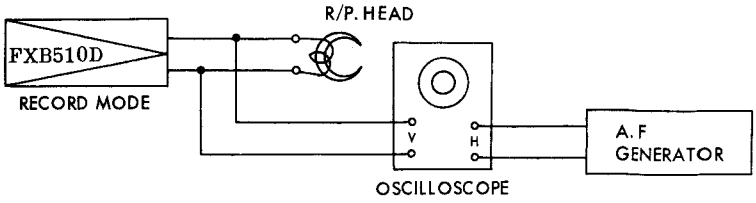


Fig. 4-4

1. Connect vertical axis of Oscilloscope across Record/Playback Head terminal and connect horizontal axis of Oscilloscope to AF Generator output. White lead is plus and red lead is minus sides.
2. When the recorder is set at RECORD mode with above connections, Lissajous' figure will appear on Oscilloscope; utilizing this figure check frequency of bias oscillator. Standard frequency is 80KC±3Kc. Adjust frequency by turning dust core of T3 (Oscillation Transformer.)

3. If frequency is not within above range by wide margin, check Oscillation Transformer (T3), C61 Capacitors and R85 Resistor.

B Record Bias Current Adjustment:
Instruments required: VTVM, 100Ω (IW) Resistor.
Measuring Circuit: Refer to Fig. 4-5.

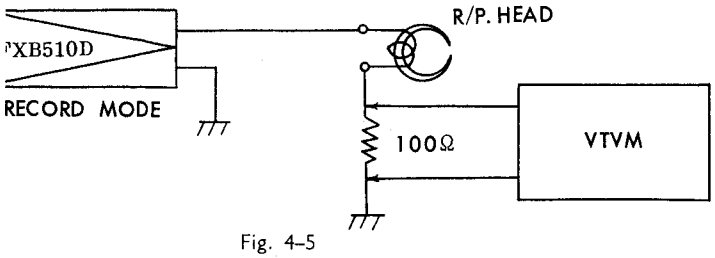


Fig. 4-5

1. Insert a 100Ω (1W) resistor in series with ground lead wire of R/P head and connect VTVM across resistor.
2. When recorder is set at RECORD mode, BIAS (to be fed to Record/Playback Head) will be indicated at VTVM.
3. As standard bias current is set at 0.9mA±0.1mA, VTVM reading should be 90mV±10mV (100Ω×0.9mA± 0.1mA).
4. If out of range, adjust R85 and C56 (C55). Decreasing the capacitance value of C56 (C55) increases the bias current.

IV. RECORD BIAS AND ERASE VOLTAGE ADJUSTMENTS:

A. Record Bias Voltage Check:
Instruments required: VTVM.
Measuring Circuit: Refer to Fig. 4-6.

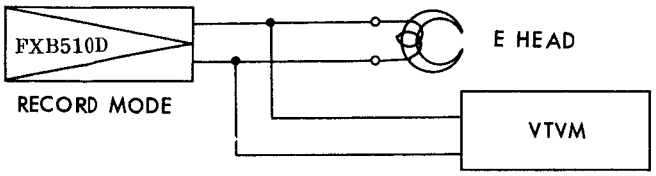


Fig. 4-6

1. Connect VTVM across R/P head terminal. White lead is plus and red lead is minus sides.
2. When recorder is in RECORD mode, Bias voltage is supplied to R/P head and is shown on VTVM.
3. The standard Bias Voltage is 30V±5V.
4. If above voltage is unobtainable at VTVM, check R85 resistor and C55 and C56 capacitors. Decreasing resistance value of R85, increase Bias Voltage and increasing capacitance values of C55 and C56 increases Bias Voltage.

B. Erase Voltage Check:
Instruments required: VTVM.
Measuring Circuit: Refer to Fig. 4-7.

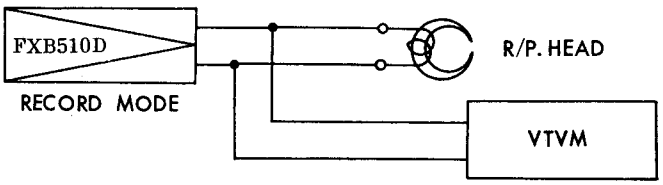


Fig. 4-7

1. Connect VTVM across Erase Head terminal. White lead is plus and red lead is minus sides.
2. When recorder is in RECORD mode, Erase Voltage is supplied to Erase Head and is shown on VTVM.
3. The standard Erase Voltage is 50V±5V.
4. If standard voltage is unobtainable at VTVM, check Erase Head, R85, C53 and C54. Increasing resistance value of R85 decreases the Erase Voltage and increasing the capacitance values of C53 and C54 increases the Erase Voltage.

V. OVERALL FREQUENCY RESPONSE CHECK:
Instruments required: AF Generator, VTVM, 100KΩ, 500Ω Resistors, 100Ω potentiometer.
Measuring Circuit: Refer to Fig. 4-2 and 4-3.

1. As shown in Fig. 4-3, connect AF Generator output to AUX input of recorder through 500Ω resistor and 100Ω potentiometer.
2. Set AF Generator output for 1Kc, adjust potentiometer to obtain 0db reading on VTVM.

REPLACEMENT PARS LIST

Fig. No.	Ref. No.	Part No.	Description
TRANSFORMERS:			
10-1	T1, T2	G12755	Transformer, Step-up
9-1, 2	T3	N590034	" Oscillation
10-1	T4	N590137	" Power
COILS			
9-1, 2	L1, L2	N590058	Coil, Trap
9-1, 2	L3	N590046	Coil, Dummy
TRANSISTORS, DIODES & SELENIUM RECTIFIER:			
9-1, 2	Tr1, Tr2		Transistor, 2SB440
9-1, 2	Tr3, Tr4		" 2SB439
9-1, 2	Tr5, Tr6		" 2SB54
9-1, 2	Tr7, Tr8		" 2SB263
9-1, 2	Tr9, Tr10		" 2SB263 C
9-3, 4	Tr301		" 2SB415
9-3, 4	D 301		Diode, Zener, 1S338Y
9-1, 2	D1, D2 D3, D4		" IN60
10-1, 2	SE301	G59016	Rectifier, Selenium, KC1.3C 22/1
SWITCHES			
9-1, 2	S1, S2	N590138	Switch, Slide, Record/Playback
9-1, 2	S3	N590139	" " Equalizer
11-1	S6	G42524	" See-Saw
11-1	S7ab	G42543	" Leaf
11-2	S8	G42544	" Micro
11-2	S9	G42520	" See-Saw
RESISTORS			
10-1	VR1, VR2	G36476	Resistor, Variable 20KΩQX
9-1, 2	VR3, VR4 VR5, VR6	G36016	" Semi-fixed 10KΩ
9-1, 2	VR7, VR8	G36015	" " 5KΩ
9-1, 2	R1, R2		" Carbon Film, ¼W, 68KΩ±10%
9-1, 2	R3, R4		" " " 15KΩ "
9-1, 2	R5, R6		" " " 10KΩ±10%
9-1, 2	R7, R8		" " " 4.7KΩ "
9-1, 2	R9, R10		" " " 220Ω "
9-1, 2	R11, R12		" " " 47KΩ "
9-1, 2	R13, R14		" " " 8.2KΩ "
9-1, 2	R15, R16		" " " 5.6KΩ "
9-1, 2	R17, R18		" " " 1.8KΩ "
9-1, 2	R19, R20		" " " 220Ω "
9-1, 2	R21, R22		" " " 3.9KΩ "
9-1, 2	R23, R24		" " " 6.8KΩ "
9-1, 2	R25, R26		" " " 100KΩ "
9-1, 2	R27, R28		" " " 18KΩ "
9-1, 2	R29, R30		" " " 22KΩ "
9-1, 2	R31, R32		" " " 10KΩ "
9-1, 2	R33, R34		" " " 5.6KΩ "
9-1, 2	R35, R36		" " " 4.7KΩ "
9-1, 2	R37, R38		" " " 120Ω "
9-1, 2	R39, R40		" " " 6.8KΩ "
9-1, 2	R41, R42		" " " 2.7KΩ "
9-1, 2	R43, R44		" " " 18KΩ "
9-1, 2	R45, R46		" " " 5.6KΩ "
9-1, 2	R47, R48		" " " 120Ω "
9-1, 2	R49, R50		" " " 10KΩ "
9-1, 2	R51/R54		" " " 1.5KΩ "
9-1, 2	R55, R56		" " " 680Ω "
9-1, 2	R57, R60		" " " 820Ω "
9-1, 2	R61, R62		" " " 470Ω "
9-1, 2	R63, R64		" " " 1KΩ "
9-1, 2	R65, R66		" " " 560Ω "
9-1, 2	R67, R68		" " " 82KΩ "
9-1, 2	R73, R74		" " " 3.3KΩ "
9-1, 2	R77, R78		" " " 1.5KΩ "

Fig. No.	Ref. No.	Part No.	Description
9-1, 2	R81, R82		Resistor, Carbon Film, ¼W, 220Ω±10%
9-1, 2	R83, R84		" " " 15KΩ "
9-1, 2	R85		" " " 10Ω "
11-2	R91, R92		" " " 220KΩ "
11-2	R93, R94		" " " 22KΩ "
11-2	R95, R96		" " " 10KΩ "
9-1, 2	R97, R98		" " " 8.2KΩ "
9-1, 2	R99, R100		" " " 330Ω "
9-3	R301		" " " 1KΩ "
9-3	R302		" " ½W, 2.2Ω "
CAPACITORS			
9-1, 2	C1/C4		Capacitor, Elec., 33μF, 16WV
9-1, 2	C5, C6		" " 47μF, 10WV
9-1, 2	C7, C8		" " 33μF, 16WV
9-1, 2	C9, C10		" " 100μF, 10WV
9-1, 2	C11, C12		" " 470μF, 16WV
9-1, 2	C13, C14		" Styrol, 2200PF, 35WV±10%
9-1, 2	C15, C16		" Mylar, 0.022μF, 50WV±20%
9-1, 2	C17, C18		" " 0.1μF, " "
9-1, 2	C19, C20		" Elec., 33μF, 16WV
9-1, 2	C21, C22		" " 47μF, 10WV
9-1, 2	C23, C24		" Mylar, 2200PF, 50WV±20%
9-1, 2	C25, C26		" Elec., 220μF, 16WV
9-1, 2	C27, C28		" " 33μF, 16WV
9-1, 2	C29, C30		" " 100μF, 10WV
9-1, 2	C31, C32		" " 33μF, 16WV
9-1, 2	C33/C36		" Mylar, 0.0047μF, 50WV±10%
9-1, 2	C37, C38		" " 0.01μF, " "
9-1, 2	C39, C42		" " 0.022μF, " "
9-1, 2	C43, C44		" " 0.047μF, " "
9-1, 2	C45, C46		" Elec., 100μF, 10WV
9-1, 2	C47, C50		" " 47μF, 16WV
9-1, 2	C51, C52		" Mylar, 0.1μF, 50WV±10%
9-1, 2	C55, C56		" Titanium, 150PF, 50WV±10%
9-1, 2	C59, C60		" Mylar, 0.01μF, " ±20%
9-1, 2	C61, C63		" " " " "
9-1, 2	C62		" " 0.022μF, " "
9-1, 2	C71, C72		" Titanium 100PF, " "
9-1, 2	C73, C74		" Mylar, 1000PF, " "
9-3	C301		" Elec., 220μF, 16WV
9-3	C302/C304		" " 470μF, 25WV
11-2	C305		" Motor Starting, 2μF, 250V AC, ±10%
9-1, 2	C309, C310		" Mylar, 0.01μF, 50WV±10%
ELECTRICAL PARTS			
7-1	1	N461021	Head, Record/Playback
7-1	2	N461022	Head, Erase
10-1	3		Fuse, 1A
10-1	4	R43304	Holder, Fuse
10-1	5	N851048	Cover, Fuse
10-1	6	G43524	Plug, 2P
10-1	7	G43504	Socket, 2P
10-1	8	N651505	Chassis, Power Transformer
10-1	9	N651504	Spacer - 4
10-1	10	G43040	Lug-Board, 4PGC
10-1	11	R66051	Heat Dissipator
10-1	12	N651271	Holder-F, PCB
10-1	13	N530150	Board, PO PCB
10-1	14	G43224	Socket, DIN 5P
10-1	15	G43941	Jack, Microphone
10-1	16	N810804	Spacer, Mic. Jack
10-1	17	G43057	Lug-Board, 2PGD
10-1	18	N590124	Cord, Power Supply
10-1	19	R83002	Bushing
10-1	20	N810860	Clumper-H, Cord

Fig. No.	Ref. No.	Part No.	Description
10-1	21	N615007	Board, Jack
10-1	22	N811024	Sheet, Jack
10-1	23	N615005	Bracket, Transformer
10-1	24	A43119A	Socket-K, Lamp
10-1	25		Lamp, Pilot 6.3V
10-1	26	N590067	Meter, Level
10-1	27	N651306	Metal-A, Reinforcement
10-1	28	N530169	Board, Printed Circuit
10-1	29	N615003	Chassis
10-1	30	T632147	Heat-Dissipator-L
10-1	31	N615006	Bracket, Switch
10-1	32	N680083	Shaft, EQ
10-1	33	N651197	Metal, EQ
10-2	34	N680164	Rod, Record Switch
10-2	35	N700287	Spring, 40
10-2	36	A65643A	Hook-K, Spring
10-2	37	N700288	Spring, Record Switch
10-2	38	N651506	Metal, Record Switch
10-2	39	N680163	Spacer, Record Switch
10-2	40	A67334A	Spacer-B
10-2	41	N651507	Metal, EQ Switch
10-2	42	N680165	Rod, EQ Switch
10-2	43	A83045	Cushion, Rubber
10-2	44	N700249	Spring, 16
MECHANICAL PARTS			
7-1	51	A65643A	Hook, Pad Spring
7-1	52	N700249	Spring, 16
7-1	53	AS-1	Head Shielding Plate Assy.
7-1	53-1	A85153B	Felt-K, Pad
7-1	53-2	A64965	Plate-B, Head Shielding
7-1	54	A64964	Plate-A, Head Shielding
7-1	55	AS-2	Pad Metal A-K Assy.
7-1	55-1	N855006	Felt-C, Pad
7-1	55-2	A65867A	Metal A-K, Pressure Pad
7-1	56	A67451	Shaft A-M, Pad Metal
7-1	57	R66296	Metal-Z, Pressure Pad
7-1	58	A67676	Shaft-C, Pad Metal
7-1	59	N680075	Guide, Tape
7-1	60	A70150	Spring, Tape Guide Height Adjustment
7-1	61	N680076	Holder, Tape Guide
7-1	62	N651203	Board, Head Mounting
7-1	63	A67624	Shaft, Instant Stop Lever
7-1	64	N651194	Lever, Instant Stop
7-1	65	R70200	Spring, Instant Stop Lever
7-1	66		String, Instant Stop Brake Movement
7-1	67	A70122A	Spring, Pinch Roller
7-1	68	A82054	Tube-A, Vinyl, Spring
7-1	69	A67674	Shaft, Pinch Roller
7-1	70	A67656A	Lever-K, Pinch Roller
7-1	71	R97720	Shaft, Pinch Roller Lever
7-1	72	R62801	Holder, Capstan
7-1	73	R97632	Capstan
7-1	74	A65406	Case, Oil
7-1	75	A48155A	Roller, Pinch
7-1	76	A65325	Cap, Oil
7-1	77	A81260A	Bearing, Flywheel
7-1	78	N651245	Cap, Spring
7-1	79	N700252	Spring, 15
7-1	80	AS-3	Flywheel Assy.
7-1	80-1		Washer, Felt 20 x 30 x 1
7-1	80-2	R81671	Flywheel
7-1	81	N680143	Screw, Spring Tension Adjustment
7-1	82	N830335	Washer, Capstan

Fig. No.	Ref. No.	Part No.	Description
7-2	91	AS-4	Rewind Idler Assy.
7-2			Ring, Stop, E-type
7-2			Washer, Oil Fabric
7-2	91-1	N700260	Spring-L, Leaf, Friction
7-2	91-2	R82083	Roller, Rewind Friction
7-2	91-3	N851031	Felt, Clutch
7-2	91-4	R97529	Idler-A, Rewind
7-2	92	A67781	Shaft, Rewind Idler
7-2	93	A67334A	Spacer-B
7-2	94	N810878	Plate, Rewind Slide
7-2	95	A65789	Lever, Rewind Idler
7-2	96	A70149	Spring, FF
7-2	97	A70057	Spring, Rewind
7-2	98	A82055	Tube-B, Vinyl, Spring
7-2	99	A48158	Idler, Rewind
7-3	100	N810920	Guide, Speed Selector
7-3	101	N680090	Screw, Stopper
7-3	102	N680098	Shaft-A, Speed Selector
7-3	103	N810855	Lever, Speed Selector
7-3	104	A70130	Spring, Speed Selector
7-3	105	AS-5	Idler Wheel Assy.
7-3	105-1		Washer, Felt, 14 x 22 x 1
7-3	105-2	N830441	Wheel, Idler
7-3	105-3		Washer, Felt, 14 x 22 x 1
7-3	106	N680077	Shaft, Idler Wheel
7-3	107	N680043	Pin, Idler Wheel
7-3	108	N810807	Plate, Idler Wheel
7-3	109	A70125	Spring, Idler
7-3	110	N810956	Cap, Idler Wheel
7-4	111	N655050	Lever-B, Selector
7-4	112	R66225	Lever-A, Selector
7-4	113	N485003	Counter, Tape
7-4	114	A83097	Belt, Tape Counter
7-4	115	N655049	Holder, Tape Counter
7-4	116	A65724	Holder, Selector Cam
7-4	117	A67464	Spacer C
7-4	118	R97593	Cam, Selector
7-4	120	AS-6	Left Brake Lever Assy.
7-4	120-1	R65925	Lever, Left Brake
7-4	120-2	A83068	Brake, Rubber
7-4	121	A70077A	Spring, Switch Lever
7-4	122	A82055	Tube-B, Vinyl, Spring
7-4	123	AS-7	Rewind Reel Hub Assy.
7-4	123-1	N636036	Plate, Span
7-4	123-2	N810954	Hub, Rewind Reel
7-4	124	N651236	Holder-K, Rewind Idler Lever
7-4	125	R70190	Spring, R Lever
7-4	126	AS-8	Instant Stop Brake Assy.
7-4	126-1	A83068	Brake, Rubber
7-4	126-2	N651195	Metal, Brake
7-4	127	N651358	Disc, Spring 15A
7-4	128	N700259	Spring 15A
7-4	129	R66293	Slide Selector
7-4	130	R93539	Spacer, Brake
7-4	131	N651237	Stopper, Idler
7-4	132	N680092	Spacer, Slide Plate
7-4	133	A67334	Spacer-B
7-4	134	A65454C	Guide-M, Slide
7-4	135	A65345	Arm, Interlock
7-4	136	A70122A	Spring, Pinch Roller
7-4	137	A82054	Tube-A, Vinyl, Spring
7-4	138	N651197	Lever-D, Stop
7-4	139	A70057	Spring, Rewind
7-4	140	N651288	Stud-B, Mechanism Holding

Fig. No.	Ref. No.	Part No.	Description
7-4	141	A67706	Stud, Panel Holding
7-4	142	N651264	Plate, Base
7-4	143	A67764	Shaft, Brake
7-4	144	N685025	Shaft-C, Reel Hub
7-4	145	N680094	Shaft, Rewind Idler
7-4	146	N651287	Metal, Custom Mounting
7-4	147	A67677	Shaft, Brake
7-4	148	A67758	Shaft-B, Selector
7-4	149	N680031	Shaft, Stop Lever
7-4	150	R97724	Stud, Head Mounting Retaining Board
7-4	151	A67757	Shaft-A, Selector
7-4	152	N651289	Stud-A, Mechanism Holding
7-4	153	A67677	Shaft, Rewind Lever
7-4	154	R70200	Spring, Record Lever
7-4	155	A82054	Tube-A, Vinyl Spring
7-4	156	N651196	Lever, Record
7-4	157	AS-9	Take-up Tension Lever Assy
7-4	157-1	N655047	Lever, Tension
7-4	157-2	R94098	Felt-F, Pad
7-4	158	R70164	Spring, Left Brake
7-4	159	AS-10	Take-up Reel Hub Assy.
7-4	159-1	N636036	Plate, Span
7-4	159-2	N810953	Hub, Take-up Reel
7-4	160	AS-11	Friction Pulley Assy
7-4	160-1	R94050	Felt, Friction
7-4	160-2	N810865	Pulley-A, Friction
7-4	161	N830449	Belt, Drive
7-4	162	A67789A	Boss-L, F.F.
7-4	163	A65728	Arm, F.F.
7-4	164	A67756	Shaft, F.F. Arm
7-4	165	A65727A	Holder-K, F.F. Arm
7-4	166	A70174C	Spring-M, F.F.
7-4	167	A65723	Lever-B, F.F.
7-4	168	A65321A	Lever-AK, F.F.
7-4	169	N830445	Cushion, Meter
7-4	170	N651200	Holder, Meter
7-4	172	N680081	Shaft, A.S.O Lever
7-4	173	R97723	Shaft, F.F. Lever
7-4	174	A85472	Supporter, Flywheel
7-4	175	AS-12	Motor Assy.
7-4	175-1	N680101	Pulley, Motor
7-4	175-2		Screw, Set, Hex. 4 x 5
7-4	175-3	N480043	Motor
7-4	176	R70194	Spring, Motor Alignment Adjustment
7-4	177	R97705	Spacer-Y, Rubber Cushion
7-4	178	R83268	Cushion-A, Rubber
7-4	179	N651276	Board, Motor
7-4	181	AS-13	Right Brake Lever Assy.
7-4	181-1	N651191	Lever, Right Brake
7-4	181-2	R94098	Felt-F, Pad
7-4	182	N651190	Lever, A.S.O.
7-4	183	N700249	Spring 16
7-4	184	A67735	Screw, Spring Tension Adjustment
7-4	185	N655052	Lever, Take-up
7-4	186	N810949	Lever-B, Micro-Switch
7-4	187	N810948	Lever-A, Micro-Switch
7-4	188	N851028	Felt, Switch Lever
7-4	189	N680102	Shaft, Micro Switch
7-4	190	N680103	Boss, A.S.O.
7-4	191	N651286	Holder, Power Switch
7-4	192	N810897	Cover, Switch
7-4	194	N651188	Plate, Switch
7-4	195	N811025	Sheet, Microphone Jack
7-4	196	N651284	Holder, Jack
7-4	197	N651292	Case, Shield
CABINET PARTS:			
8	201	N810917	Knob, Speed Selector
8	202	AS-14	Head Cover-B Assy.
8	203	AS-15	Head Cover-A Assy.
8	204	N810853	Knob, Recording Level Control
8	205	N871005	Knob, Mode Selector
8	206	A81230	Knob-B, Slide
8	207	N810882	Knob, Instant Stop Lever
8	208	AS-16	Accessory Compartment Assy.
8	210	AS-17	Top Panel Assy.
8	211	R66252	Banana-tip
8	212	A67709A	Post A-K, Tape
8	213	AS-18	Cabinet Assy.
8	215	N651224	Grille, Ventilation
8	216	N950125	Name Plate
8	217	A83094	Foot-B, Rubber
8	218	A85814	Washer, Knob
ACCESSORIES			
13	221	R81698	7" Reel
13	222	R83199	Cap, Reel
13	224	N680088	Screw, Auxiliary Feet Fixing
13	225	AS-19	Auxiliary Rubber Feet Assy.
13	226	R92121	Screw, Capstan
13	227	R97634	Capstan 4.75

SCREWS, NUTS, WASHERS, ETC.:

Ref. No.	Description
X4	Screw, SC-2606
X5	" SC-2608
X10	" SC+3010
X11	" SC+3012
X12	" SS+3008
X14	Screw, SC+3008
X15	" SC+3006
X16	" SS+3006
X27	" BB+3006
X29	" BT+3006
X30	" SC+4015
X43	" Tapping, 3ϕ x 8 type-C
X44	" Holding, 3ϕ x 12
X45	" " 4ϕ x 12
X55	Nut, Hex., NMB 301
X57	" " NMS 401
X59	Washer, 3.2 x 12 x 1
X60	" 4.2 x 14 x 1
X61	" 4.2 x 18 x 1
X62	" 3.2 x 14 x 1.5
X65	" ZB261
X67	" ZB301
X68	" 3.2 x 10 x 1
X71	" 3.2 x 8 x 1
X76	" Spring VB401
X77	" " VB301
X78	" " VB261
X79	" " VB201
X80	" Long, R93094
X88	Eyelet, 3ϕ x 3.8
X90	Stop-Ring, E-type, E2,3
X91	" " E4
X92	" " E7
X94	Washer, Phenolic, 3.7 x 8 x 0.3
X95	" " 5.2 x 10 x 0.3
X96	" " 5.2 x 13 x 0.3
X97	" " 5.2 x 7.5 x 0.3

Ref. No.	Description
X98	Washer, Phenolic, 6.2 x 10 x 0.3
X99	" Oil Fabric 5.2 x 10 x 0.3
X100	" " 5.2 x 13 x 0.3
X101	" " 7.2 x 14 x 0.3
X102	" " 8.5 x 14 x 0.3
X103	" Felt 5 x 10 x 2
X104	" " 7 x 12 x 2
X106	" Fiber 3.2 x 7 x 0.8
X107	" " 3.2 x 8 x 0.8
X109	" " 6.2 x 12 x 0.8
X110	" " 12.7 x 20 x 0.8
X133	Screw, SC+4008
X139	Nut, Hex., NMB 201
X141	Washer, ZS301
X155	Rivet, Tublar, 3ϕ x 7.5
X158	Eyelet, 2ϕ x 3
X159	Washer, ZS201
X169	Screw, Wood, KSC+2404
X170	Lug, Earth, 3ϕ
X171	" " 4ϕ
X172	Screw, Wood, KSS+2706
X182	" SC+3018
X188	" SC+3004
X189	" SC+2604

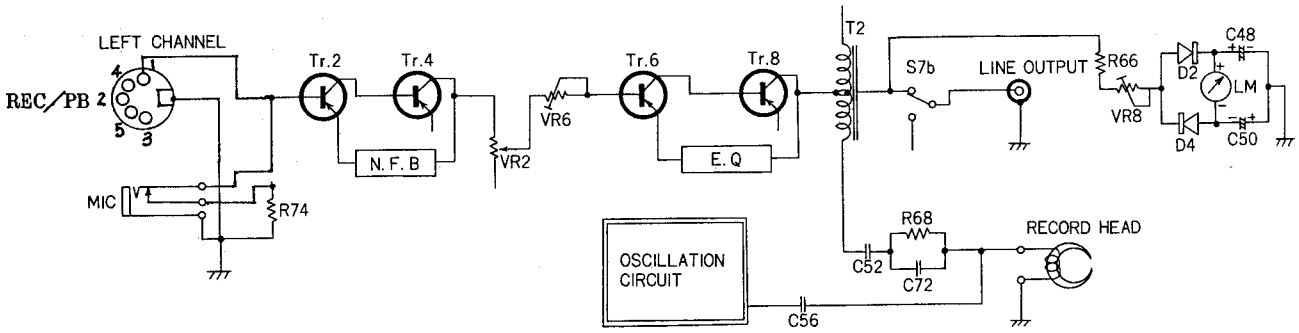
Ref. No.	Description
X191	" SC+4020
X201	" BC-2005
X202	Washer, Oil Fabric, 4.7 x 10 x 0.3
X209	Nut, Hex., NMS261
X210	" " NMS301
X211	Screw, BB+2014
X236	" BB+3008
X245	Nut, Self-tapping, PSN-1.8
X249	Nail, 1.2ϕ x 8
X253	Lug, Soldering 3ϕ
X254	Washer, 4.2 x 16 x 1.6
X255	" , Felt 20 x 30 x 1
X256	Stop-Ring, E-type E3.2
X257	Washer, Fiber 3.2 x 10 x 1
X259	Screw, BC+2006
X260	" SC-2615
X263	" SC-2612
X267	" SC+4008
X269	" SC+4025
X270	" SB+4014
X271	Washer, Oil Fabric 7.8 x 13 x 0.8
X273	" Felt, 6 x 30 x 1
X289	Screw, BB+2005
X290	" BC+3008

TECHNICAL INFORMATION ON CIRCUITS :

1 RECORDING AMPLIFIER CIRCUIT & RECORDING LEVEL INDICATOR CIRCUIT

Tr2 ····· First stage amplifier circuit transistor
Tr4 ····· Second " " " "
Tr6 ····· Third " " " "
Tr8 ····· Fourth " " " "
VR2 ····· Input Level Control
VR6 ····· Channel Balance Control

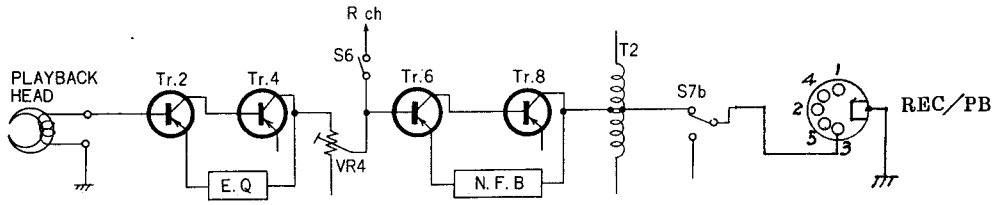
T2 ····· Step-up Transformer
S7b ····· Stop-Switch
C52, C72, R68 ····· Constant Current Circuit
VR8 ····· Level Indicator Balance Control
D2, D4 ··· Rectifier Circuit Diodes
LM ····· Level Indicator



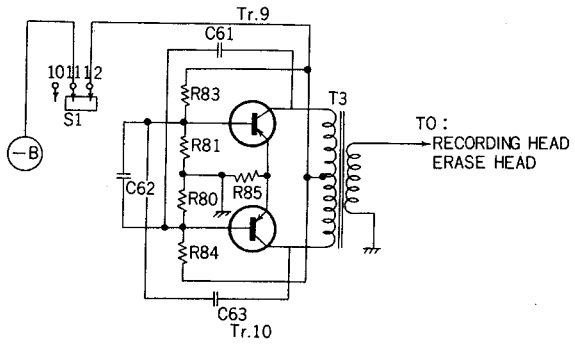
2 PLAYBACK AMPLIFIER CIRCUIT

TR2 ····· First stage amplifier circuit transistor
Tr4 ····· Second " " " "
Tr6 ····· Third " " " "
Tr8 ····· Fourth " " " "

VR4 ····· Channel Balance Control
S6 ····· Mode Switch
T2 ····· Step-up Transformer
S7b ····· Stop-Switch

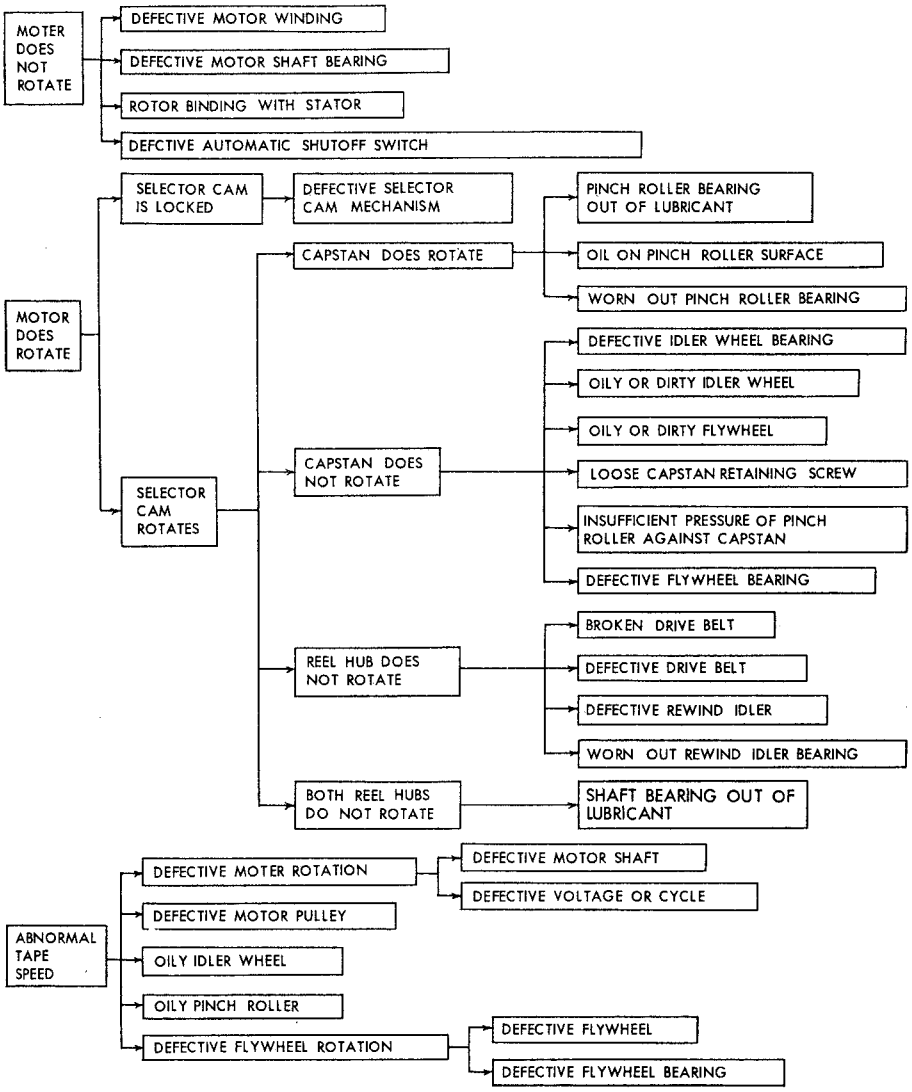


3 OSCILLATION CIRCUIT



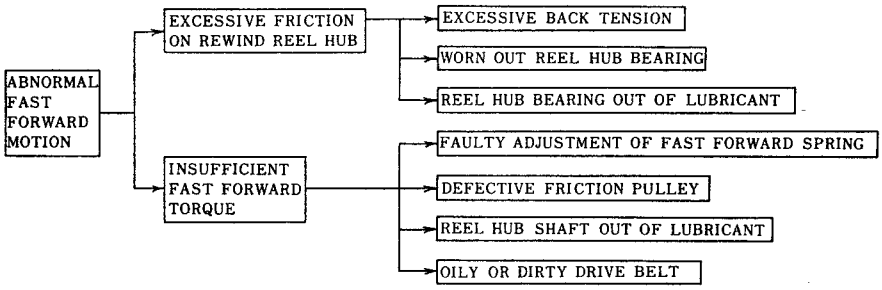
Tr9, Tr10 ·····Oscillator Circuit Transistors
T3 ·····Oscillator Transformer
C61, C62 ·····Oscillation Frequency Adjustment Capacitors

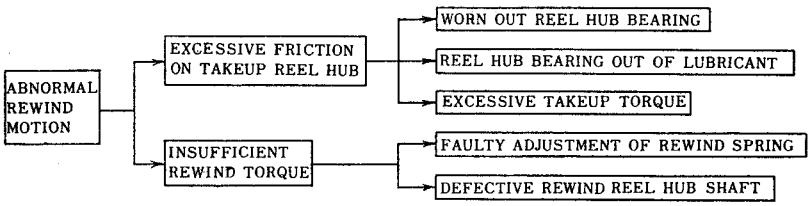
TROUBLE SHOOTERS' GUIDE : 1. Malfunction in Playback/Record Mode

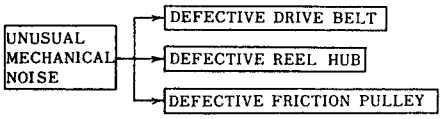

MOTER DOES NOT ROTATE
DEFECTIVE MOTOR WINDING
DEFECTIVE MOTOR SHAFT BEARING
ROTOR BINDING WITH STATOR
DEFCTIVE AUTOMATIC SHUTOFF SWITCH
MOTOR DOES ROTATE
SELECTOR CAM IS LOCKED
DEFECTIVE SELECTOR CAM MECHANISM
SELECTOR CAM ROTATES
CAPSTAN DOES ROTATE
CAPSTAN DOES NOT ROTATE
REEL HUB DOES NOT ROTATE
BOTH REEL HUBS DO NOT ROTATE
PINCH ROLLER BEARING OUT OF LUBRICANT
OIL ON PINCH ROLLER SURFACE
WORN OUT PINCH ROLLER BEARING
DEFECTIVE IDLER WHEEL BEARING
OILY OR DIRTY IDLER WHEEL
OILY OR DIRTY FLYWHEEL
LOOSE CAPSTAN RETAINING SCREW
INSUFFICIENT PRESSURE OF PINCH ROLLER AGAINST CAPSTAN
DEFECTIVE FLYWHEEL BEARING
BROKEN DRIVE BELT
DEFECTIVE DRIVE BELT
DEFECTIVE REWIND IDLER
WORN OUT REWIND IDLER BEARING
SHAFT BEARING OUT OF LUBRICANT

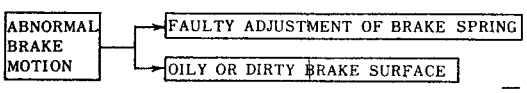
TROUBLE SHOOTERS' GUIDE:

2. Malfunctions in Fast Forward/Rewind Motion:

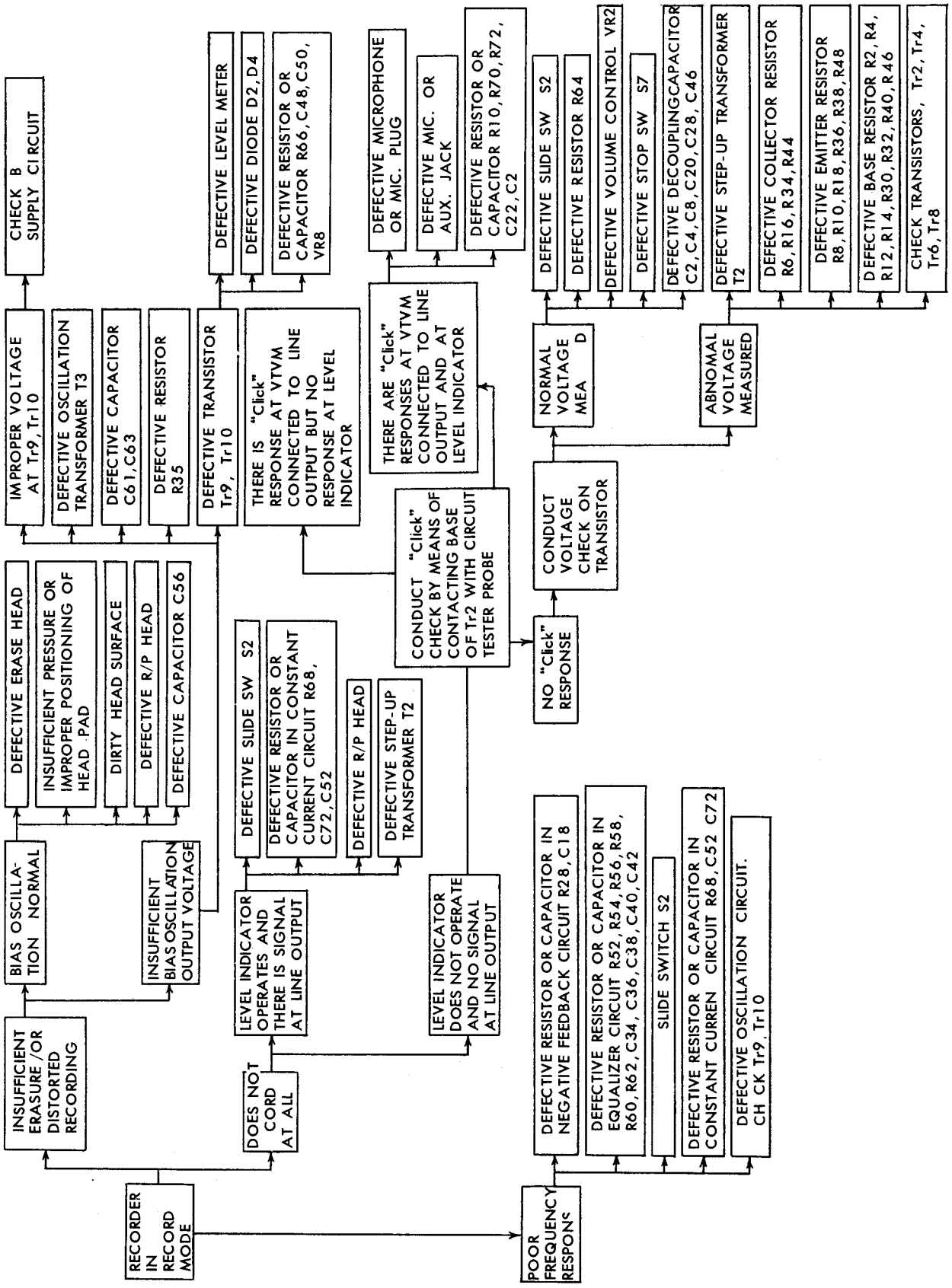

ABNORMAL FAST FORWARD MOTION
EXCESSIVE FRICTION ON REWIND REEL HUB
INSUFFICIENT FAST FORWARD TORQUE
EXCESSIVE BACK TENSION
WORN OUT REEL HUB BEARING
REEL HUB BEARING OUT OF LUBRICANT
FAULTY ADJUSTMENT OF FAST FORWARD SPRING
DEFECTIVE FRICTION PULLEY
REEL HUB SHAFT OUT OF LUBRICANT
OILY OR DIRTY DRIVE BELT


ABNORMAL REWIND MOTION
EXCESSIVE FRICTION ON TAKEUP REEL HUB
INSUFFICIENT REWIND TORQUE
WORN OUT REEL HUB BEARING
REEL HUB BEARING OUT OF LUBRICANT
EXCESSIVE TAKEUP TORQUE
FAULTY ADJUSTMENT OF REWIND SPRING
DEFECTIVE REWIND REEL HUB SHAFT

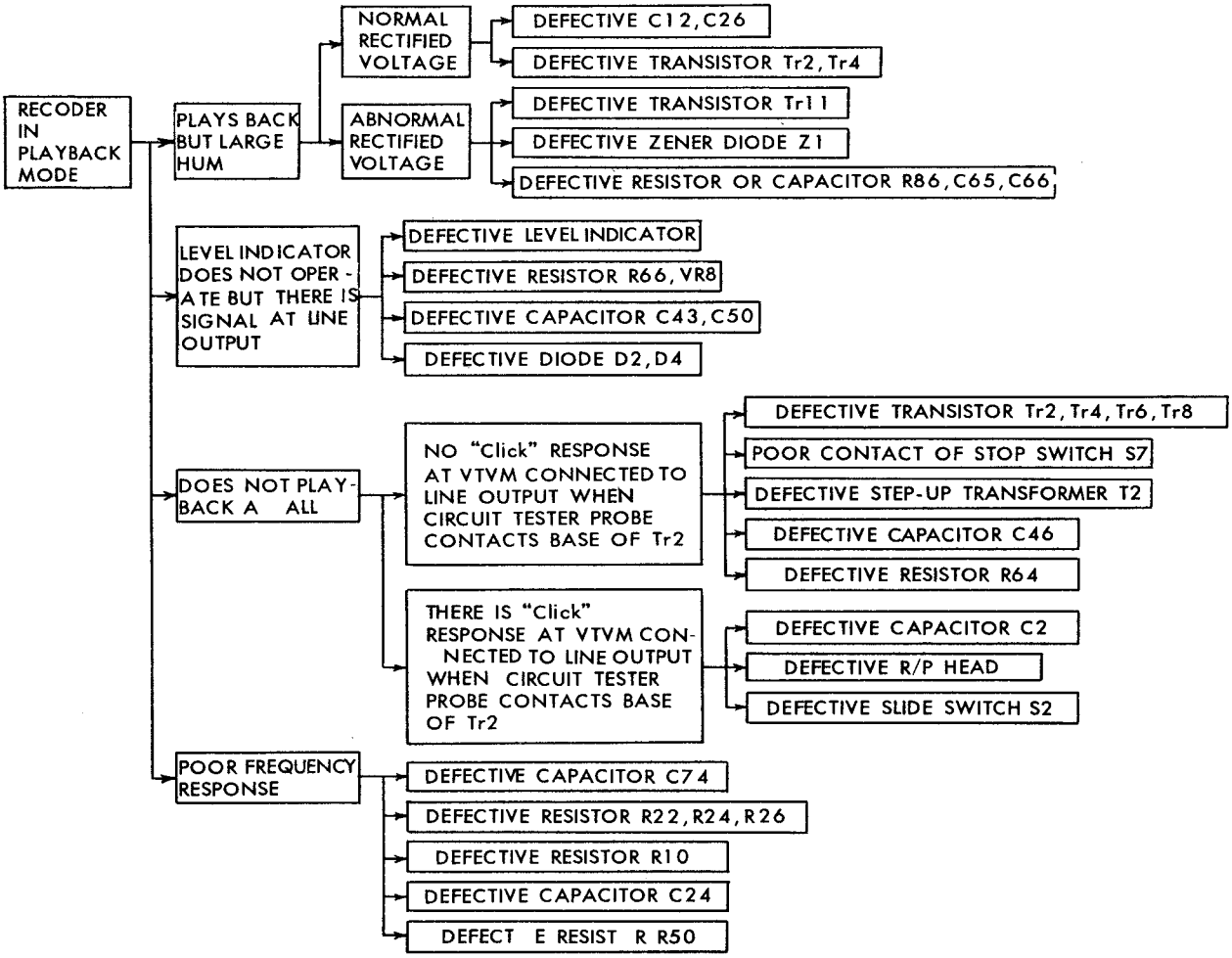




3. Defective Recording Circuit (shows CH.1 only. CH.2 same as CH.1)


RECORDER IN RECORD MODE
INSUFFICIENT ERASURE /OR DISTORTED RECORDING
BIAS OSCILLATION NORMAL
DEFECTIVE ERASE HEAD
INSUFFICIENT PRESSURE OR IMPROPER POSITIONING OF HEAD PAD
DIRTY HEAD SURFACE
DEFECTIVE R/P HEAD
DEFECTIVE CAPACITOR C56
INSUFFICIENT BIAS OSCILLATION OUTPUT VOLTAGE
IMPROPER VOLTAGE AT Tr9, Tr10
DEFECTIVE OSCILLATION TRANSFORMER T3
DEFECTIVE CAPACITOR C61, C63
DEFECTIVE RESISTOR R35
DEFECTIVE TRANSISTOR Tr9, Tr10
CHECK B SUPPLY CIRCUIT
DEFECTIVE LEVEL METER
DEFECTIVE DIODE D2, D4
DEFECTIVE RESISTOR OR CAPACITOR R66, C48, C50, VR8
DOES NOT CORD AT ALL
LEVEL INDICATOR OPERATES AND THERE IS SIGNAL AT LINE OUTPUT
DEFECTIVE SLIDE SW S2
DEFECTIVE RESISTOR OR CAPACITOR IN CONSTANT CIRCUIT R68, C72, C52
DEFECTIVE R/P HEAD
DEFECTIVE STEP-UP TRANSFORMER T2
THERE IS "Click" RESPONSE AT VTVM CONNECTED TO LINE OUTPUT BUT NO RESPONSE AT LEVEL INDICATOR
LEVEL INDICATOR DOES NOT OPERATE AND NO SIGNAL AT LINE OUTPUT
CONDUCT "Click" CHECK BY MEANS OF CONTACTING BASE OF Tr2 WITH CIRCUIT TESTER PROBE
THERE ARE "Click" RESPONSES AT VTVM CONNECTED TO LINE OUTPUT AND AT LEVEL INDICATOR
DEFECTIVE MICROPHONE OR MIC. PLUG
DEFECTIVE MIC. OR AUX. JACK
DEFECTIVE RESISTOR OR CAPACITOR R10, R70, R72, C22, C2
NO "Click" RESPONSE
CONDUCT VOLTAGE CHECK ON TRANSISTOR
NORMAL VOLTAGE MEA D
ABNOMAL VOLTAGE MEASURED
DEFECTIVE SLIDE SW S2
DEFECTIVE RESISTOR R64
DEFECTIVE VOLUME CONTROL VR2
DEFECTIVE STOP SW S7
DEFECTIVE DECOUPLINGCAPACITOR C2, C4, C8, C20, C28, C46
DEFECTIVE STEP-UP TRANSFORMER T2
DEFECTIVE COLLECTOR RESISTOR R6, R16, R34, R44
DEFECTIVE EMITTER RESISTOR R8, R10, R18, R36, R38, R48
DEFECTIVE BASE RESISTOR R2, R4, R12, R14, R30, R32, R40, R46
CHECK TRANSISTORS, Tr2, Tr4, Tr6, Tr8
POOR FREQUENCY RESPONSE
DEFECTIVE RESISTOR OR CAPACITOR IN NEGATIVE FEEDBACK CIRCUIT R28, C18
DEFECTIVE RESISTOR OR CAPACITOR IN EQUALIZER CIRCUIT R52, R54, R56, R58, R60, R62, C34, C36, C38, C40, C42
SLIDE SWITCH S2
DEFECTIVE RESISTOR OR CAPACITOR IN CONSTANT CURREN CIRCUIT R68, C52 C72
DEFECTIVE OSCILLATION CIRCUIT. CH CK Tr9, Tr10

4. Defective Playback Circuit (shows CH.1. only. CH.2 same as CH.1)


RECODER IN PLAYBACK MODE
PLAYS BACK BUT LARGE HUM
NORMAL RECTIFIED VOLTAGE
DEFECTIVE C12, C26
DEFECTIVE TRANSISTOR Tr2, Tr4
ABNORMAL RECTIFIED VOLTAGE
DEFECTIVE TRANSISTOR Tr11
DEFECTIVE ZENER DIODE Z1
DEFECTIVE RESISTOR OR CAPACITOR R86, C65, C66
LEVEL INDICATOR DOES NOT OPERATE BUT THERE IS SIGNAL AT LINE OUTPUT
DEFECTIVE LEVEL INDICATOR
DEFECTIVE RESISTOR R66, VR8
DEFECTIVE CAPACITOR C43, C50
DEFECTIVE DIODE D2, D4
DOES NOT PLAY-BACK A ALL
NO "Click" RESPONSE AT VTVM CONNECTED TO LINE OUTPUT WHEN CIRCUIT TESTER PROBE CONTACTS BASE OF Tr2
DEFECTIVE TRANSISTOR Tr2, Tr4, Tr6, Tr8
POOR CONTACT OF STOP SWITCH S7
DEFECTIVE STEP-UP TRANSFORMER T2
DEFECTIVE CAPACITOR C46
DEFECTIVE RESISTOR R64
THERE IS "Click" RESPONSE AT VTVM CONNECTED TO LINE OUTPUT WHEN CIRCUIT TESTER PROBE CONTACTS BASE OF Tr2
DEFECTIVE CAPACITOR C2
DEFECTIVE R/P HEAD
DEFECTIVE SLIDE SWITCH S2
POOR FREQUENCY RESPONSE
DEFECTIVE CAPACITOR C74
DEFECTIVE RESISTOR R22, R24, R26
DEFECTIVE RESISTOR R10
DEFECTIVE CAPACITOR C24
DEFECT E RESIST R R50

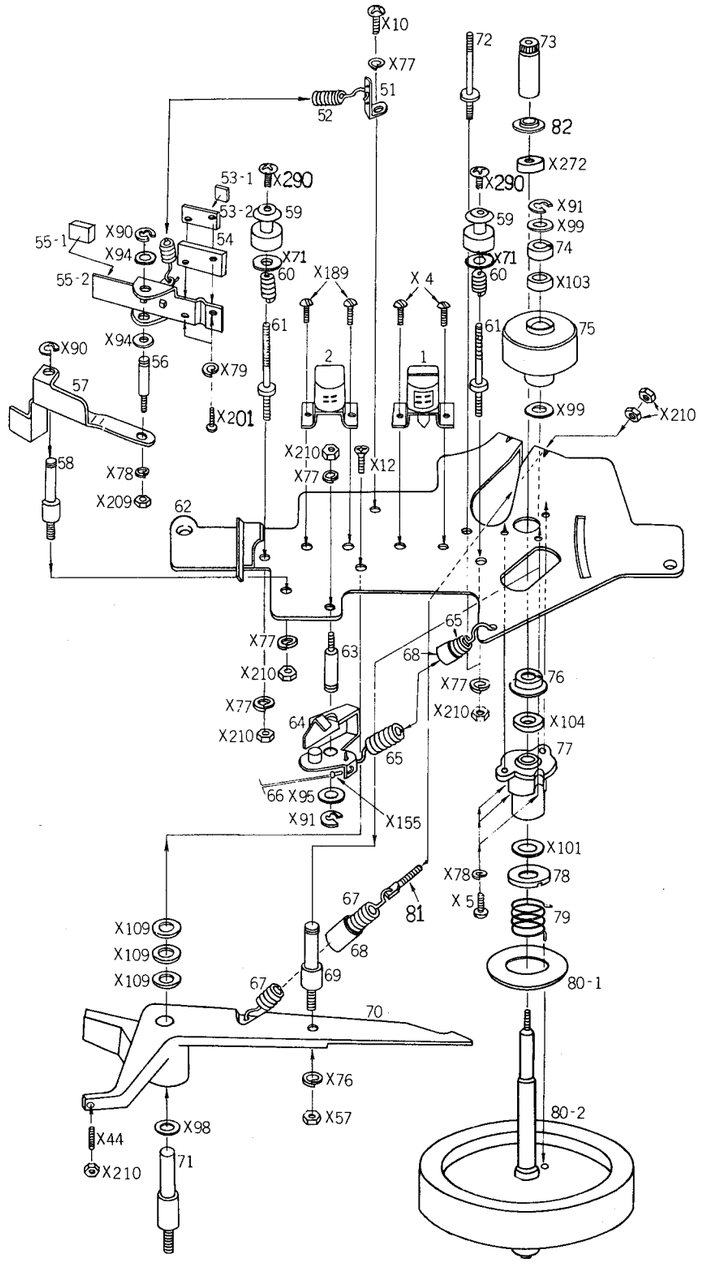


FIG. 7-1 EXPLODED VIEW OF HEAD MOUNTING BOARD ASSEMBLY

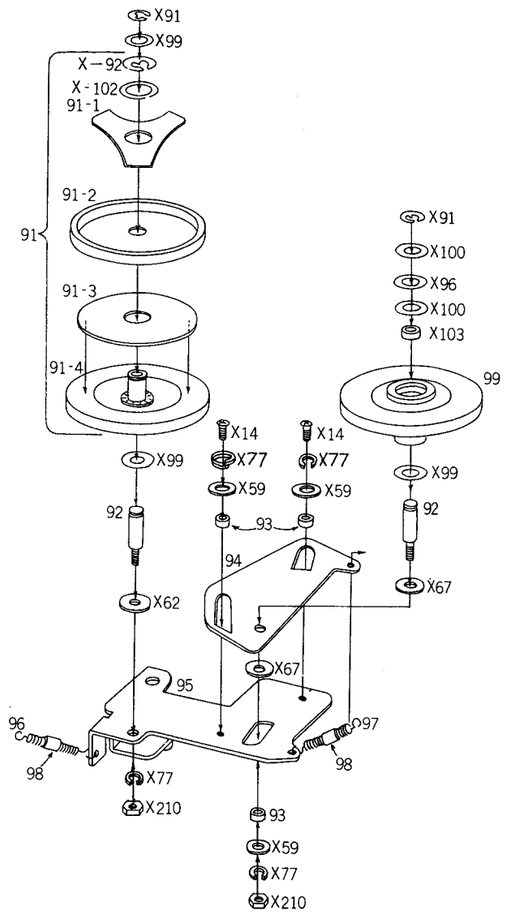


FIG. 7-2 EXPLODED VIEW OF REWIND IDLER MECHANISM ASSEMBLY

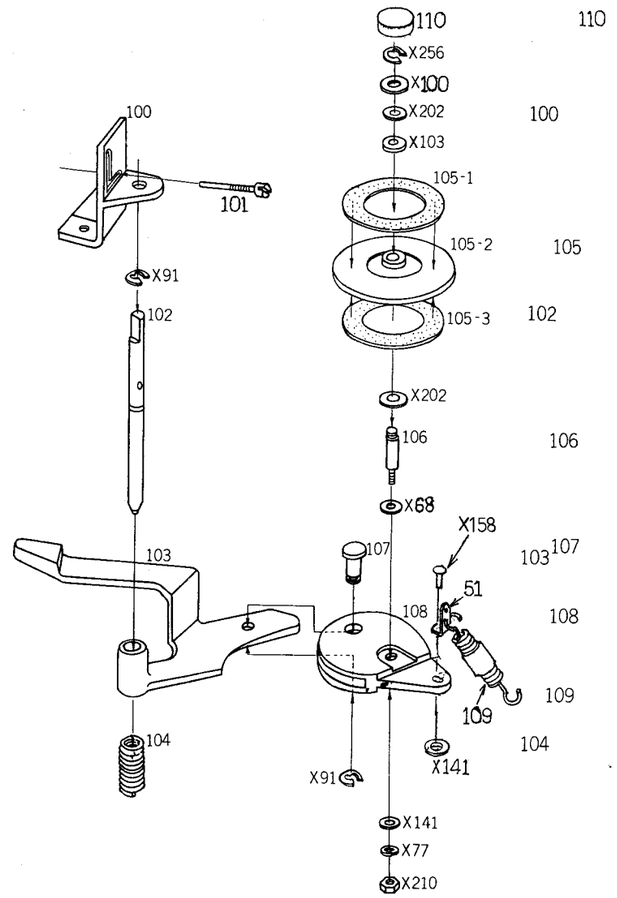


FIG. 7-3 EXPLODED VIEW OF SPEED SELECTOR MECHANISM ASSEMBLY

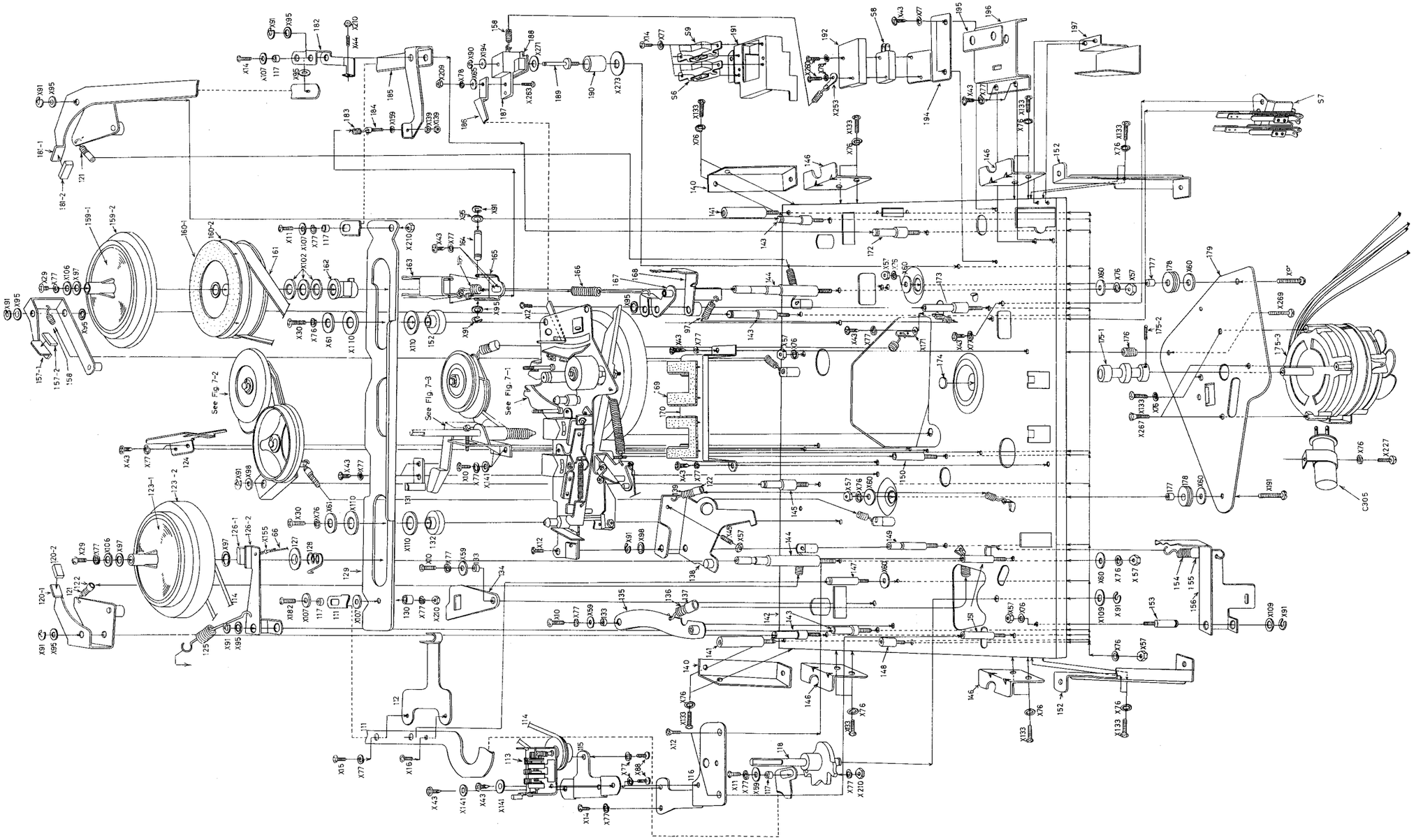


FIG. 7-4 EXPLODED VIEW OF MECHANISM

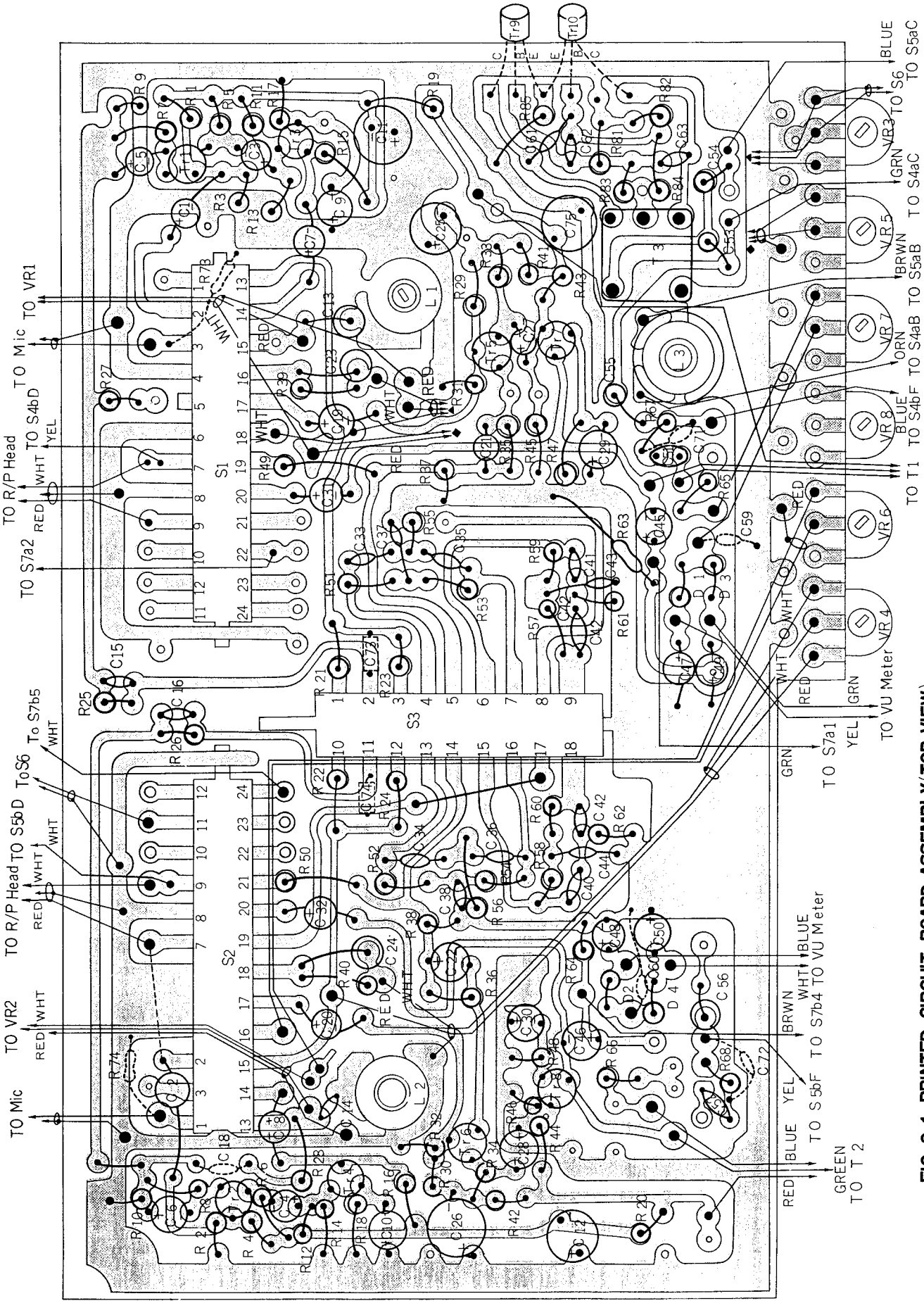


FIG. 9-1 PRINTED CIRCUIT BOARD ASSEMBLY(TOP VIEW)

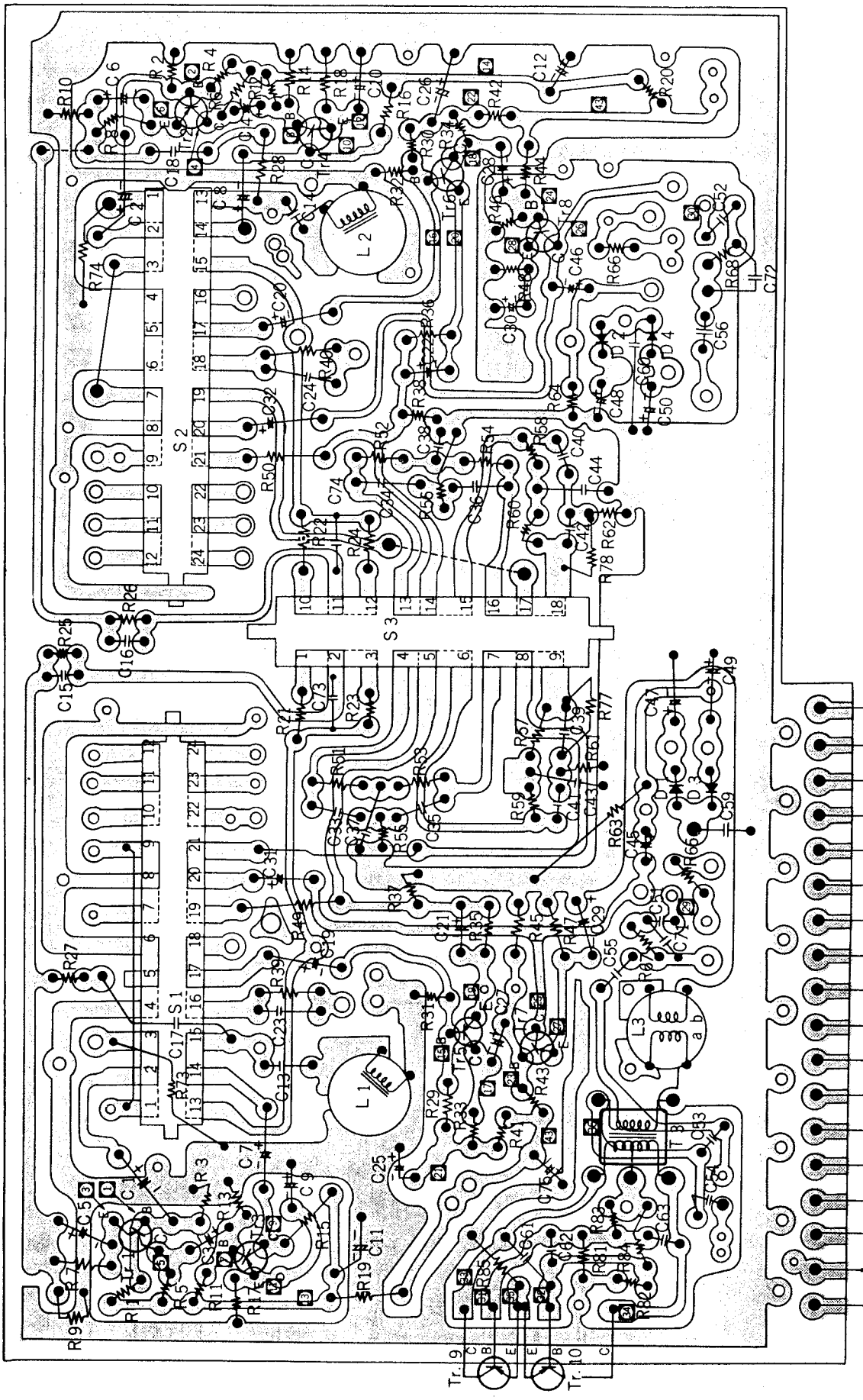


FIG. 9-2 PRINTED CIRCUIT BOARD ASSEMBLY (BOTTOM VIEW)

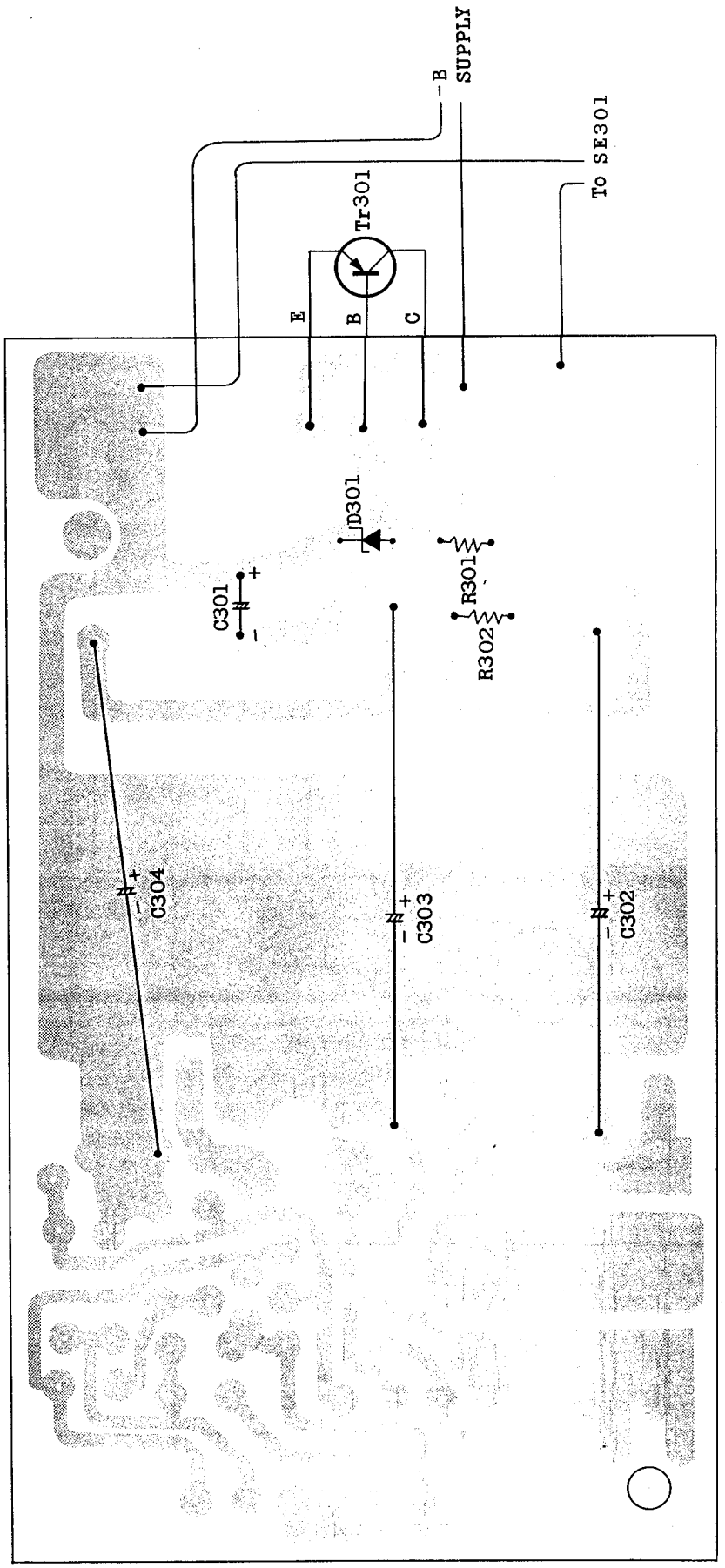


FIG. 9-3 POWER SUPPLY PRINTED CIRCUIT BOARD ASSEMBLY (CUPPER SIDE)

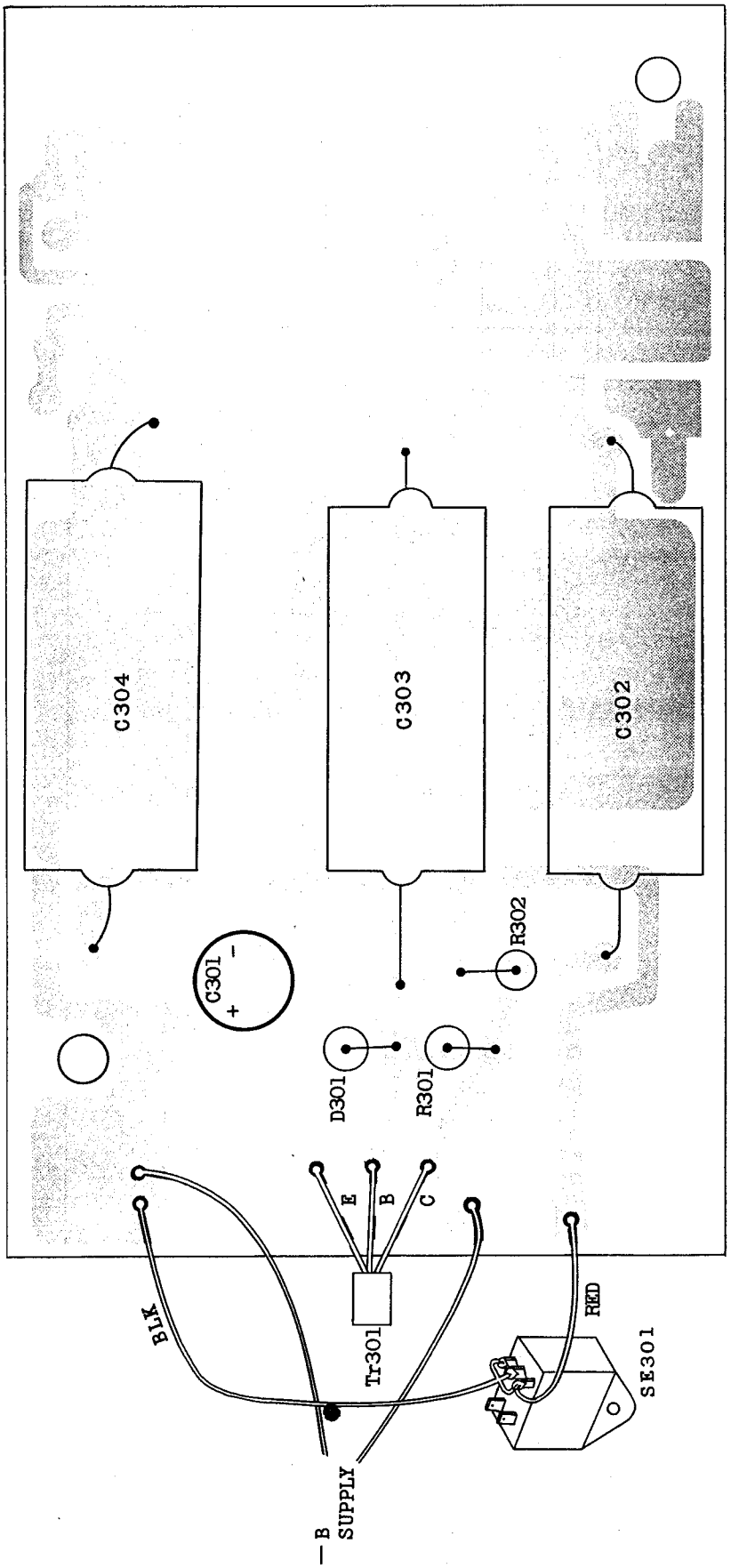


FIG. 9-4 POWER SUPPLY PRINTED CIRCUIT BOARD ASSEMBLY (COMPONENT SIDE)

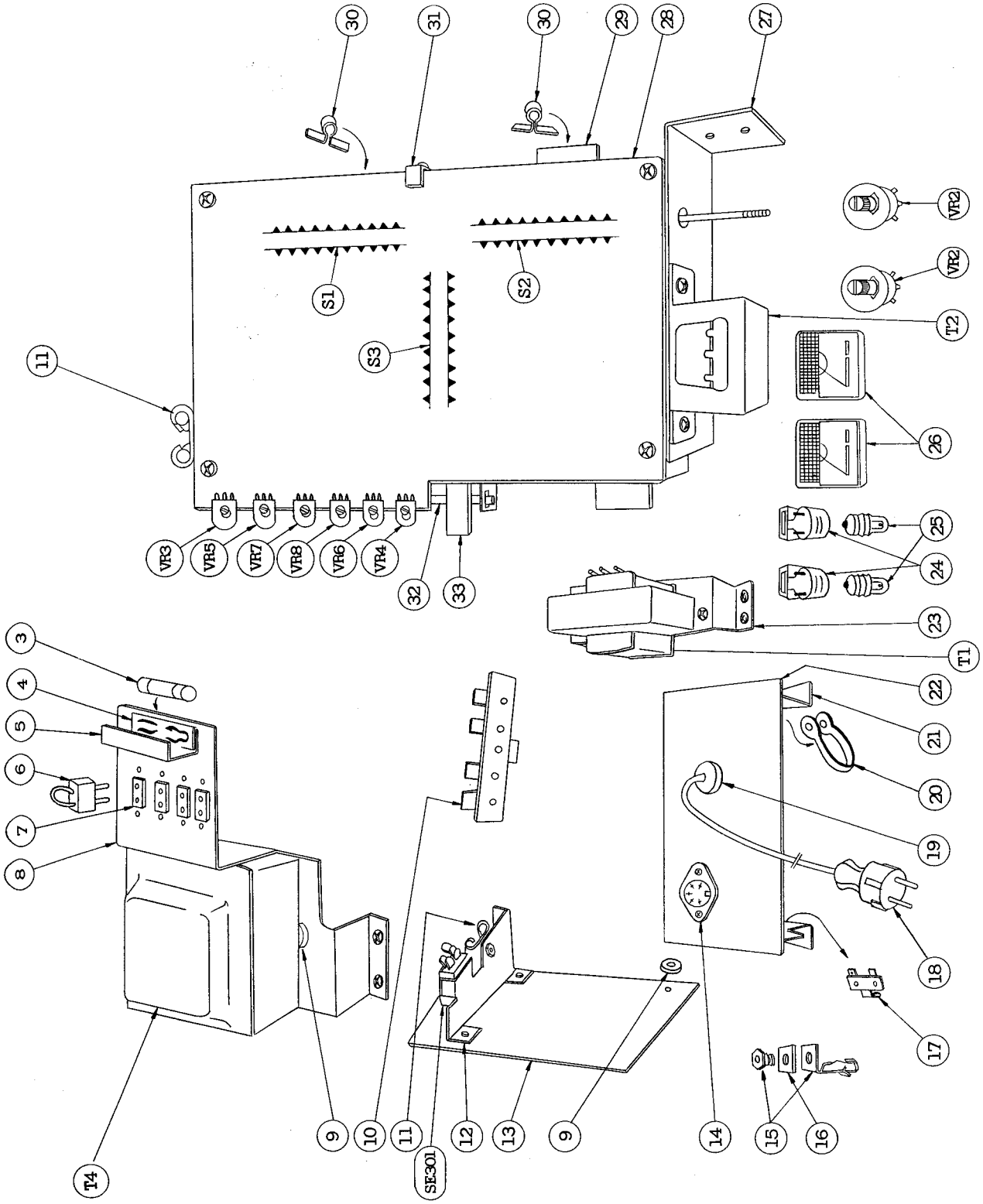


FIG. 10-1 LOCATION OF ELECTRICAL PARTS: BACK VIEW

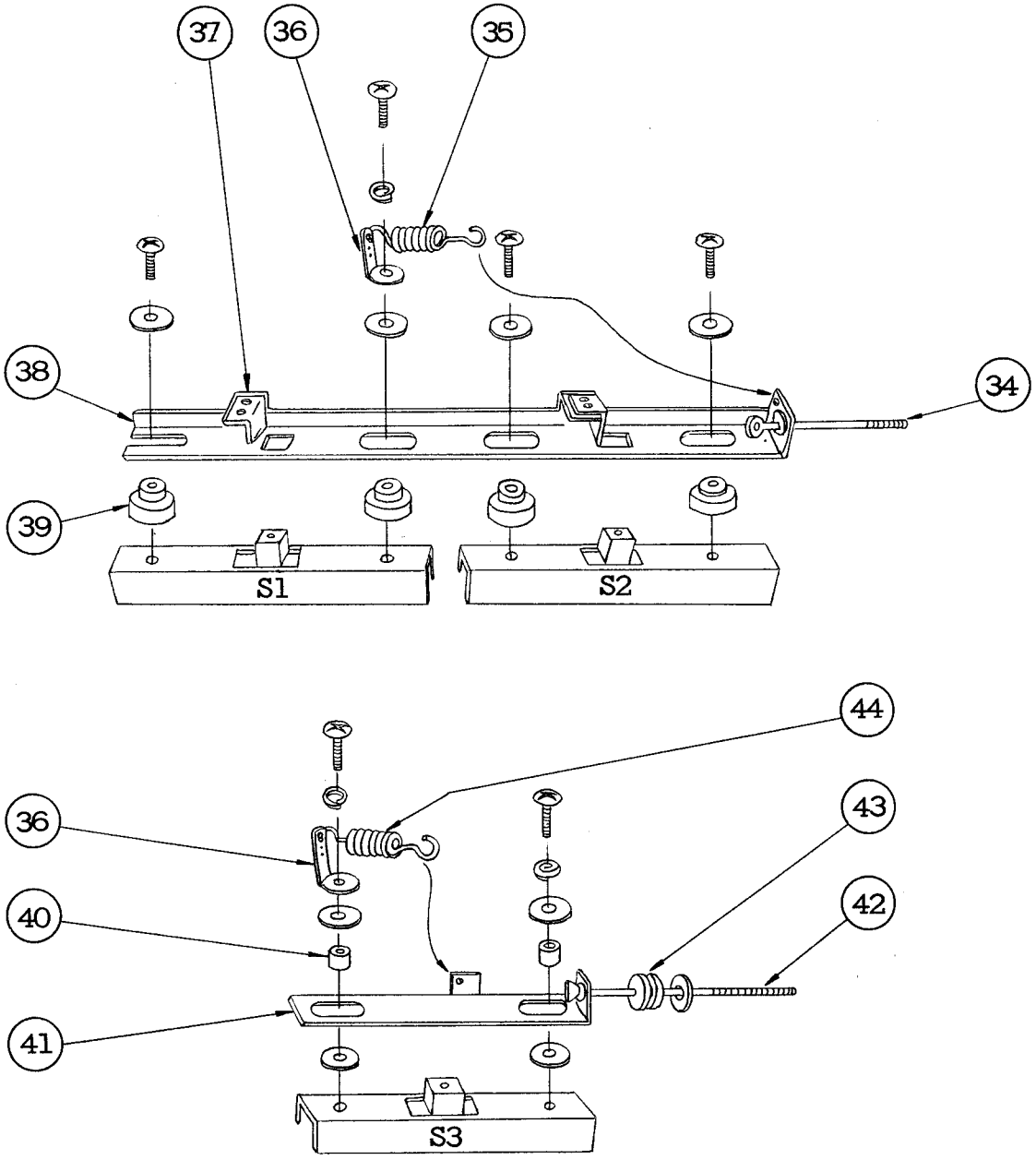


FIG. 10-2 EXPLODED VIEWS OF SWITCH LINKAGE

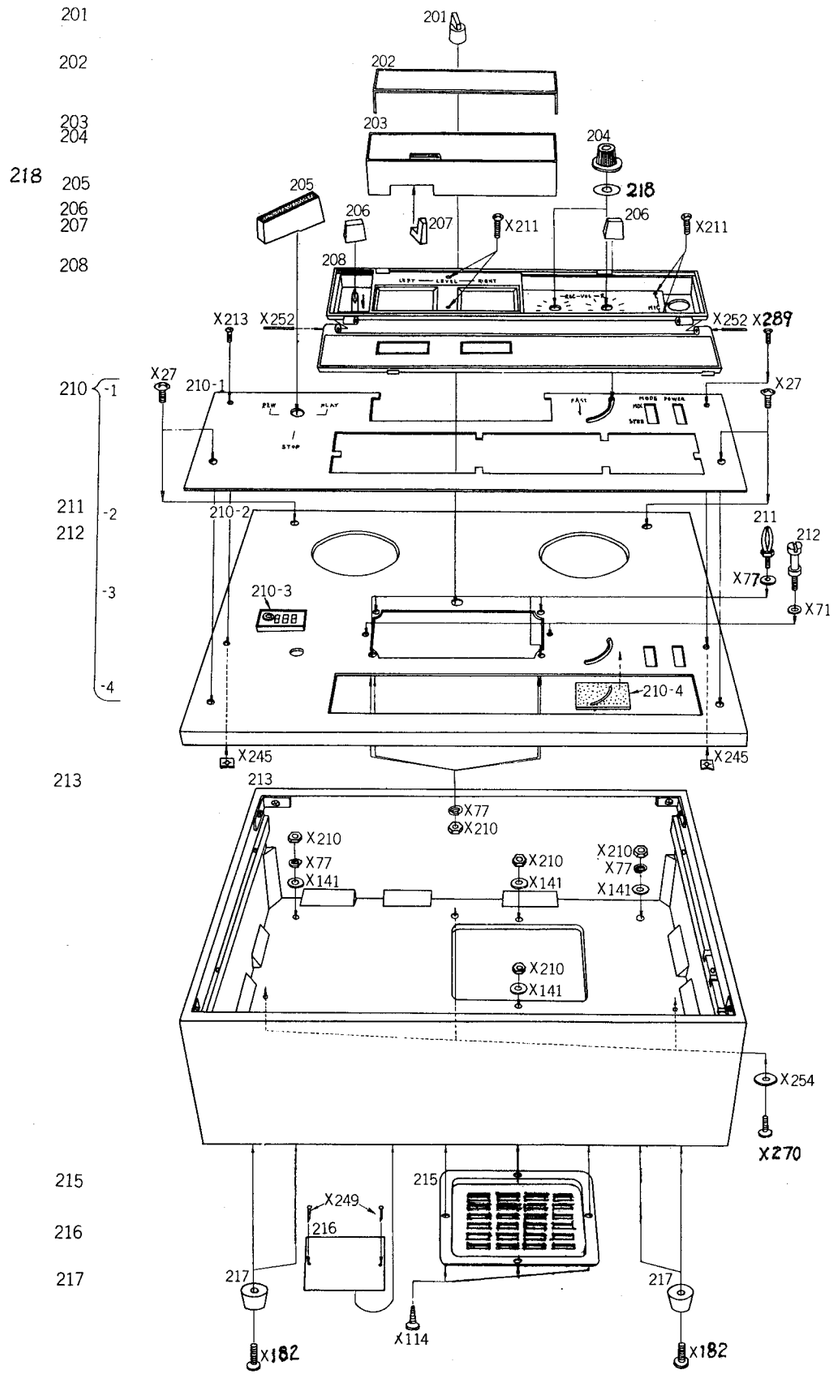
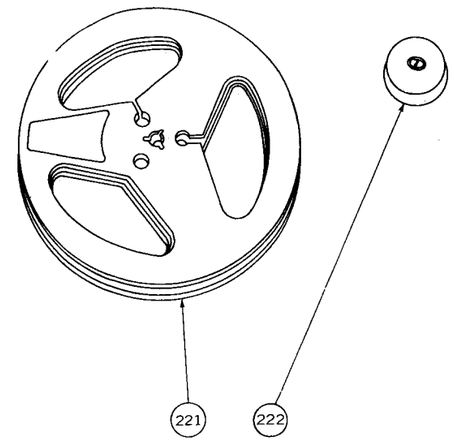


FIG. 8 EXPLODED VIEW OF CABINET



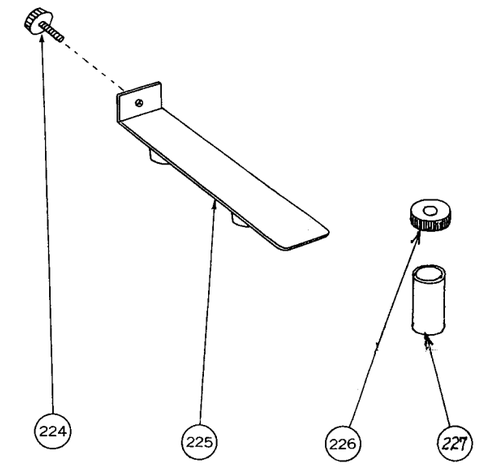


FIG. 13 ACCESSORIES

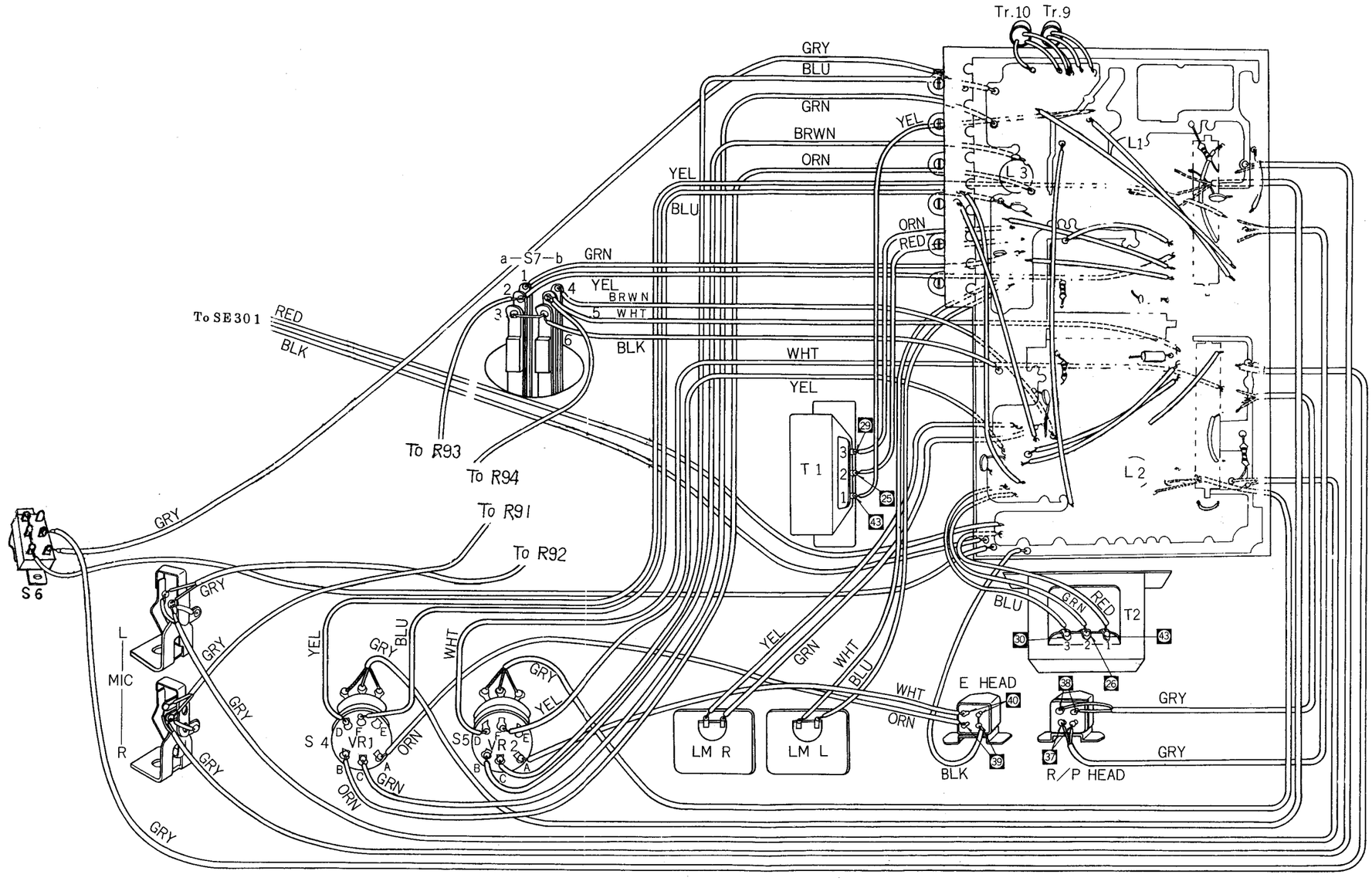


FIG. 11-1 WIRING CONNECTION DIAGRAM

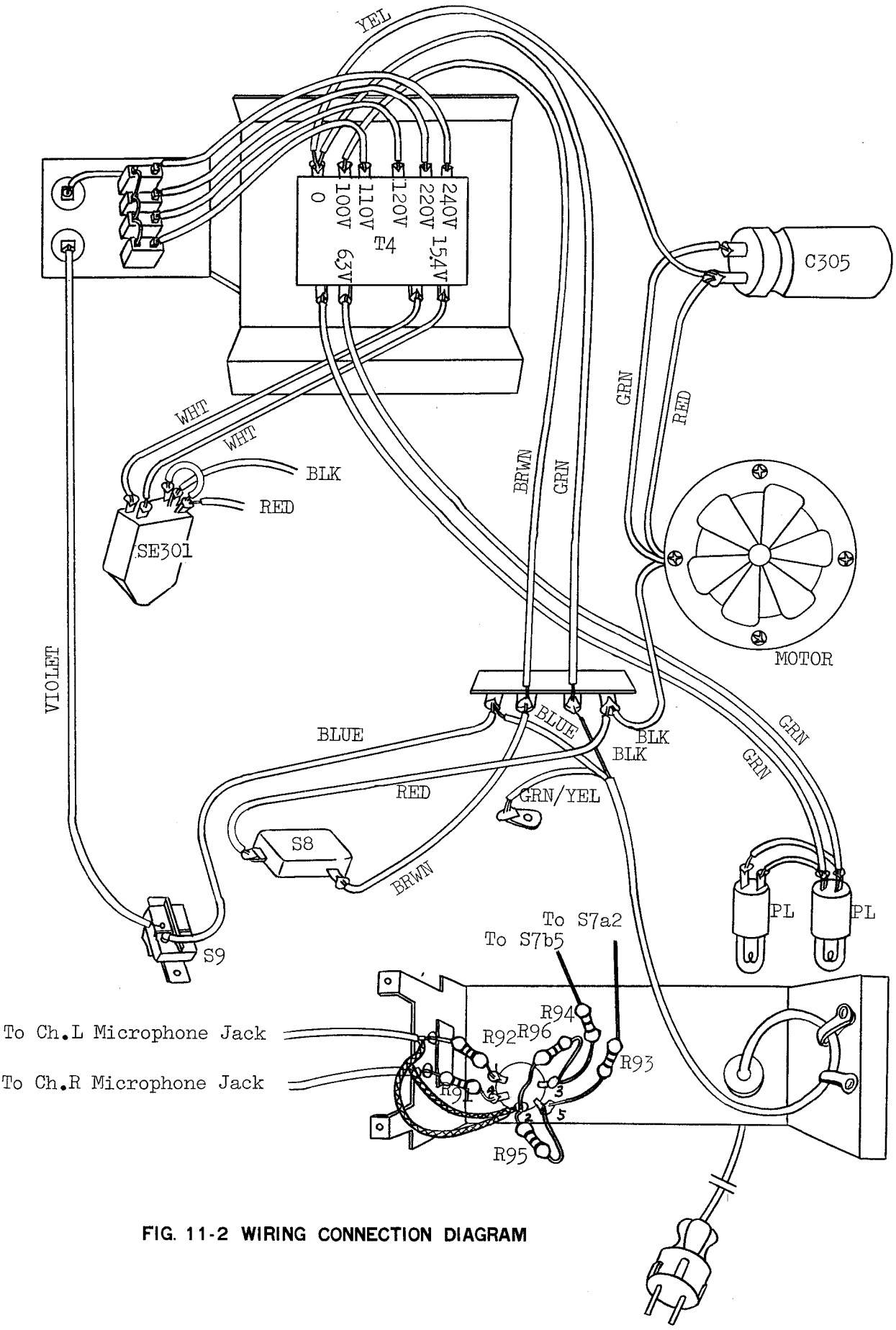
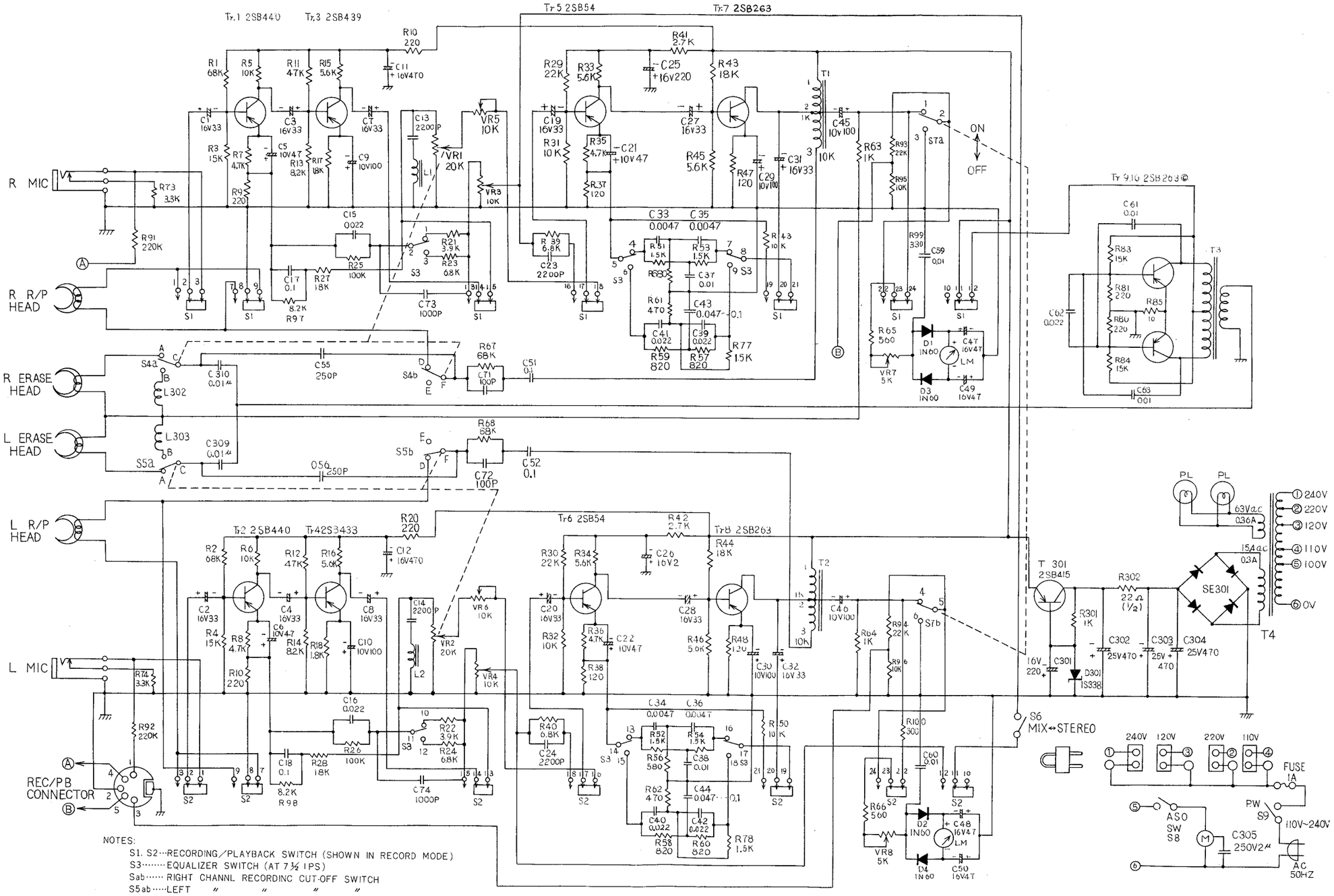


FIG. 11-2 WIRING CONNECTION DIAGRAM



NOTES:

S1. S2···RECORDING/PLAYBACK SWITCH (SHOWN IN RECORD MODE)
S3·····EQUALIZER SWITCH (AT 7½ IPS)
S4ab····RIGHT CHANNL RECORDING CUT-OFF SWITCH
S5ab····LEFT " " " "
S6·····PLAYBACK MODE SWITCH (SHOWN IN STEREO MODE)
S7ab····MUTING SWITCH
S8·····AUTOMATIC SHUT-OFF SWITCH
S9·····AC POWER SWITCH

FIG. 12 SCHEMATIC DIAGRAM